

SPECIFICATIONS
FOR
AN ARMY VESSEL
FOR USE IN
MINE FIELD OPERATIONS
TO BE KNOWN AS
DISTRIBUTION BOX BOATS
"L63"
AND CLASS

These specifications are issued for and shall govern the construction of two additional boats of this "L-63" Class so far as the actual construction is concerned but any deviation therefrom as noted in the Invitation for Bids shall govern changes in dates, places of delivery and acceptance, liquidated damages for delay, time and place of opening of bids, etc.

WAR DEPARTMENT
OFFICE OF THE QUARTERMASTER GENERAL
U. S. ARMY

WASHINGTON, D. C.
MAY, 1928

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10—

WAR DEPARTMENT
OFFICE OF THE QUARTERMASTER GENERAL
U. S. ARMY

SPECIFICATIONS
FOR AN
ARMY VESSEL OF TUGBOAT TYPE

FOR USE IN THE MINE FIELD OPERATIONS OF
THE COAST ARTILLERY CORPS

TO BE KNOWN AS

DISTRIBUTION BOX BOATS OF "L63"
AND CLASS

*Prepared in the
Office of the Quartermaster General*

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The Quartermaster General

Water Transportation Service

BRIGADIER GENERAL F. H. POPE, U. S. Army, Q. M. Corps
In Charge

SUPERVISING MARINE ENGINEER FRANK VAN VLECK

Washington, D. C. - May, 1928



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON

1928

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FOREWORD

These specifications are as proposed for the construction of a wooden 64-foot type of harbor vessel for the use of the War Department, bids for which will be opened in Washington on June 8, 1928.

This volume contains a reduced set of plans of general characteristics of the vessel; technical specifications of hull, machinery, and equipment, circular of proposal, nature of contractual obligations to be assumed, and forms used for submission of bids.

Published by the Quartermaster General, War Department, Washington, by the Chief of Transportation Service, Brig. Gen. F. H. Pope, Quartermaster Corps, in charge.

Contracting officer will be the quartermaster officer of the corps area in which the shipyard of the accepted bidder is located.

Naval architect, Frank Van Vleck, supervising marine engineer, office of the Quartermaster General, War Department, Washington, D. C.

MAY, 1928.

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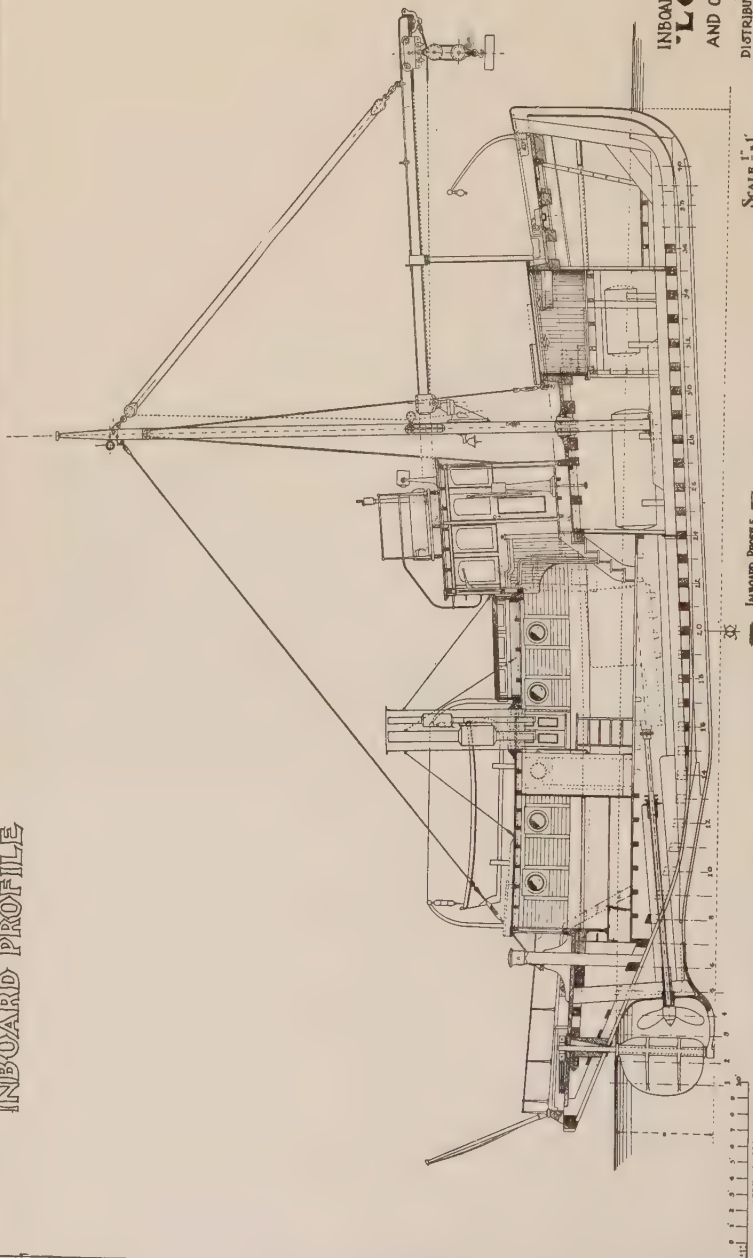
(Inserts in this volume, which are to be considered as part of these specifications)

1. Inboard profile.
2. Outboard profile.
3. Midship section.
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5. Section through cockpit.
6. Main deck.
7. Hold plan.

(These plans are reduced photographically, and the scale used should be checked against the dimensions written in with figures. Blue prints made properly to scale can be furnished on request to the Quartermaster General, War Department, Washington, D. C.)



INBOARD PROFILE



INBOARD PROFILE
"L 63"
AND CLASS

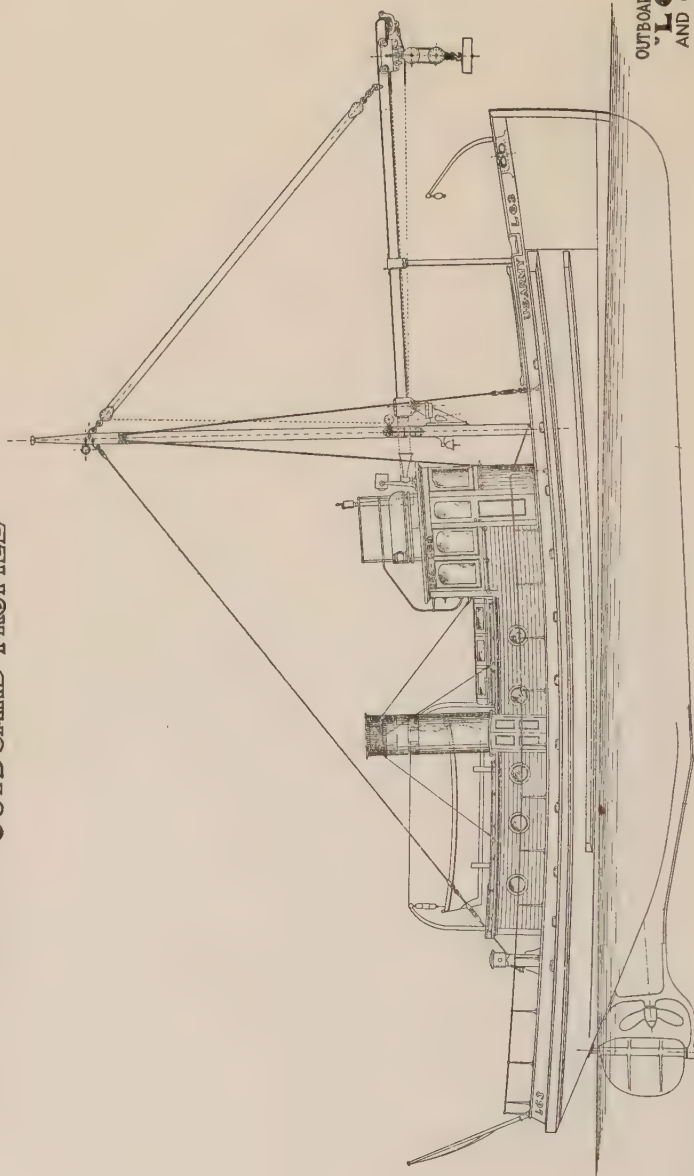
DISTRIBUTION BOX VESSEL
FOR SUBMARINE SERVICE
OFFICE OF THE QUARTERMASTER GENERAL
NAVY DEPARTMENT

SCALE $1\frac{1}{2}'' = 1'$
John W. H. H. H.
STEERING MACHINE ENGINEER

INBOARD PROFILE
SCALE $1/2'' = 1'$ FOOT

APRIL 15, 1923

OUTBOARD PROFILE



0 5 10 15 20 25 30
APRIL 15, 1928

OUTBOARD PROFILE
SCALE 1/2" = 1' 0"

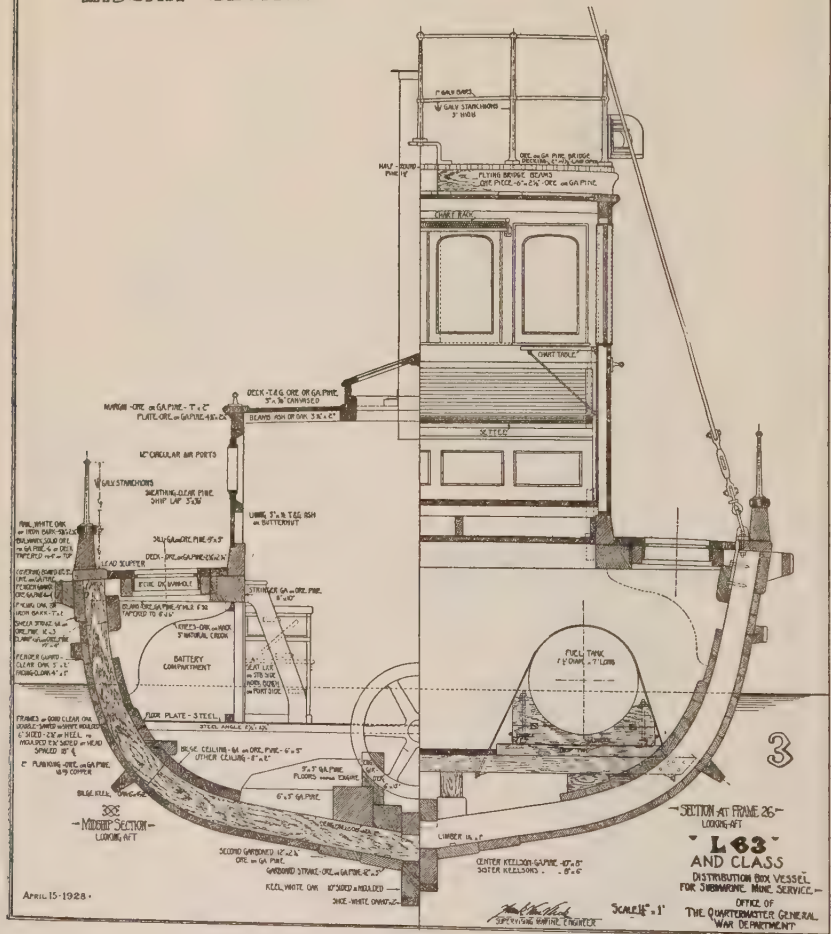
SCALE 1/2" = 1'
J. H. H. 1928
SUPERINTENDING ENGINEER

OUTBOARD PROFILE
"L63"
AND CLASS

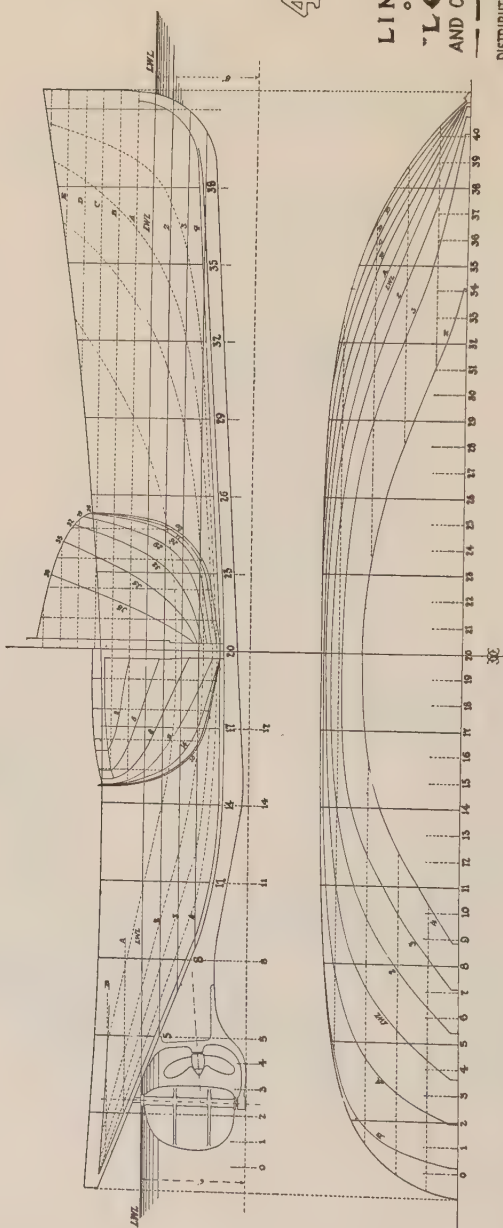
DISTRIBUTION BOX VESSEL
FOR SUBMARINE MINE SERVICE
OFFICE OF THE QUARTERMASTER GENERAL
NAVY DEPARTMENT

2

MIDSHIP SECTION



LINES "L63"



4

LINES
OF
"L63"
AND CLASS

DISTRIBUTION BOX
VESSEL FOR
SUBMARINE MINE SERVICE
OFFICE OF THE QUARTERMASTER GENERAL
NAVY DEPARTMENT

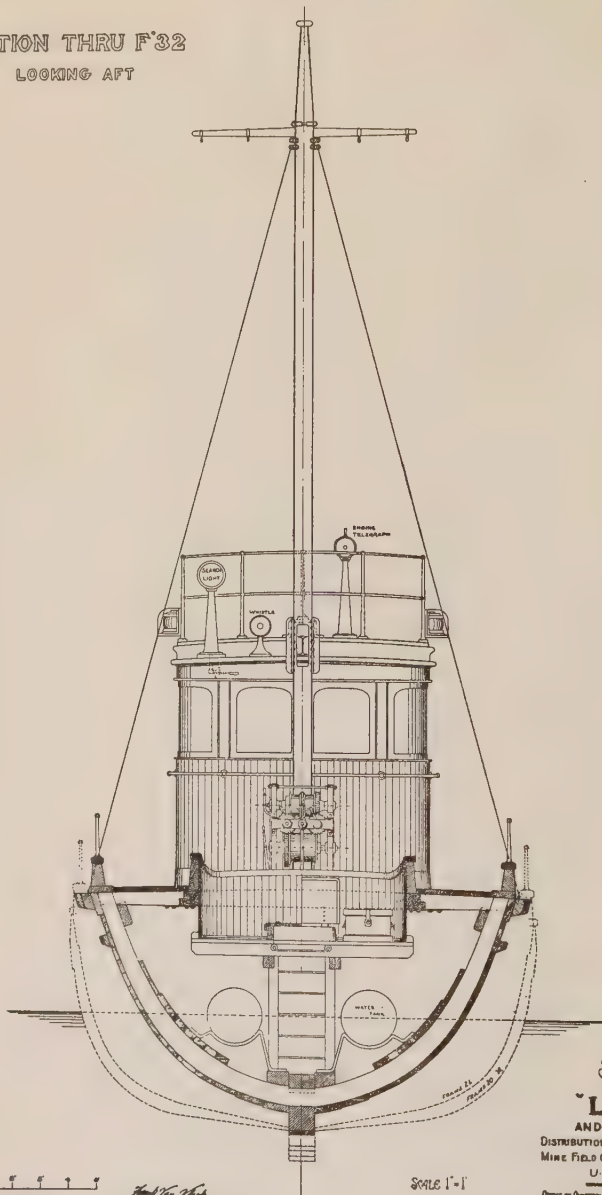
SCALE $\frac{1}{2}$ " = 1'
John W. Wood
SUPERVISING MACHINE ENGINEER

APRIL 15, 1928.



SECTION THRU F'32

LOOKING AFT



APRIL 15, 1920

Franklin D. Smith
SUPERVISING NAVAL ENGINEER

SCALE 1"=1'

5

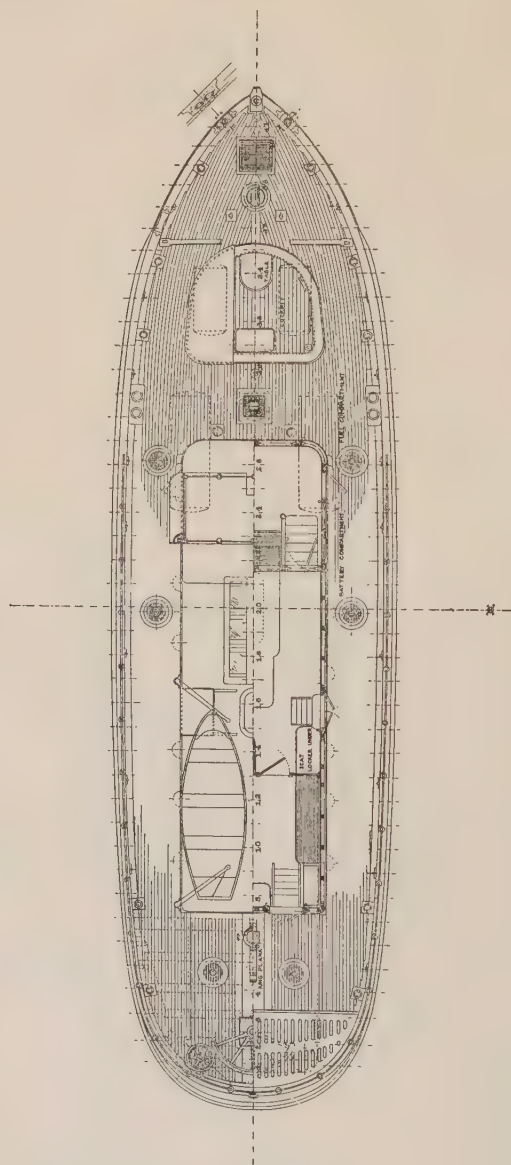
L63

AND CLASS

DISTRIBUTION BOX BOAT FOR
MINE FIELD OPERATIONS OF THE
U.S. ARMY

OFFICE OF QUARTERMASTER GENERAL, OFFICE OF THE ADJUTANT
GENERAL, WASHINGTON, D.C.

DECK PLAN



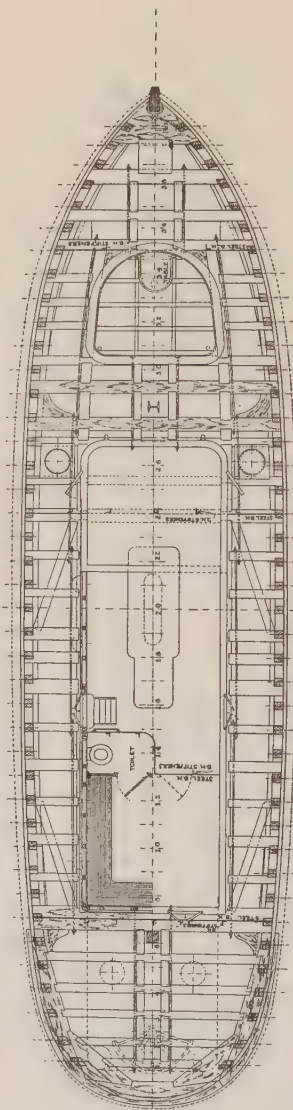
6

"L63"
AND CLASS
DISTRIBUTION VESSEL
FOR SURVIVOR - HOME SERVICE -
OFFICE OF
THE QUARTERMASTER GENERAL
WAR DEPARTMENT

SCALE 1" = 1'

Paul W. H. H.
PROFESSOR MARINE ENGINEERING

HOLD PLAN



7

L 63.
AND CLASS
 DISTRIBUTION BOX VESSEL
 FOR SUBMARINE MINE SERVICE
 OFFICE OF
 THE QUARTERMASTER GENERAL
 NAVAL DEPARTMENT

SCALE 1" = 1'

John H. M. Jones
 SUPERVISING DRAWING ENGINEER

CHAPTER 1

GENERAL DESCRIPTION

SPECIFICATIONS "L 63," FOR CONSTRUCTION AND EQUIPMENT OF 64-FOOT DISTRIBUTION-BOX BOATS FOR SUBMARINE MINE SERVICE OF THE WAR DEPARTMENT, TO BE CONTRACTED FOR BY THE QUARTERMASTER CORPS, UNITED STATES ARMY

Bids to be opened on June 8, 1928

1. Principal Dimensions.

	Ft.	in.
Length over all-----	64	0
Length on L. W. L. (6 feet 6 inches above base)-----	59	0
Beam, molded-----	16	0
Beam, over guards-----	17	4
Depth, molded-----	6	6
Draft, loaded-----	6	0
Speed per hour-----	10	knots.

2. Extent of Specifications.

The intent and spirit of these specifications is that the contractor shall construct and equip a first-class boat for marine mine field work ready for service, to be built, launched, and fitted completely in all respects, with all necessary fittings, as hereinafter described, or as shown by drawings, including Diesel engine and all other machinery, auxiliary air compressor, electric generator plant, piping systems, pumps, shafting, propeller, deck houses, joiner work, plumbing work and fixtures, painting, deck fittings, derrick mast, boom with traveler, winch on mast or deck, anchors, chains, steering gear, cabin furnishings, fire apparatus, binnacle and compass, engineer's tools, oil and fuel tanks, cabin and ship's lights, etc. In general, all necessary and usual fittings for the successful operation of a first-class boat in every respect, whether specially mentioned or not, and any articles pertaining to the satisfactory completion of the boat which may have been inadvertently omitted from these specifications or from the official drawings but which are deemed necessary by the officer in charge for the completion of the boat and its equipment in its entirety are to be supplied by the contractor without extra charge.

3. Object of Boat.

The object of this boat is to properly serve for the work of the Coast Artillery on the mine field in making up the joints of various submarine electric cables into a large water-tight metallic distribution box about 27 inches in diameter, which distribution box is to be placed safely overboard and lowered to the bottom of the bay or sea by means of the traveler on the boom after the cable joints are completed or hoisted again to the surface if desired, the operation to be accomplished without injury to the boat, cables, or distribution box. The weight of box with cables will be approximately 3,000 pounds, but under exceptionally severe conditions the stress may increase to about 6,960 pounds. The boat is intended to work in the open sea and plant these boxes and cables in 200 feet of water.

The boat is to be suitable for occasional towing purposes, for artillery targets, or small boats.

The boat, machinery, and all fittings and gear throughout must be of first-class material and workmanship in every respect and must be complete in all their respective parts.

4. Delivery.

The vessel is to be delivered to the War Department afloat at the wharf of either the Brooklyn, N. Y., Army Base, or San Francisco, Calif., Army Base, with all delivery charges paid thereon to either of these destinations, complete in good condition and running order, in all respects satisfactory to the department. All underway machinery trials must have been satisfactorily completed, all parts of the machinery installation have been shown to be in first-class condition and approved by the Army inspecting officers or officials charged with this inspection.

5. Certificate of Delivery.

A formal certificate of delivery shall be executed, giving the date and hour of delivery, with inventory of all supplies on board at transfer, with the documents of the American Bureau of Shipping and the Steamboat Inspection Service, and such other papers and things as will constitute a proper transfer under the terms of this contract. The certificate of delivery to be receipted for by such officer of the Quartermaster Corps, United States Army, as may be deputized for this purpose.

6. Tests of Hull and Machinery.

The contractor, at his own expense, will be required, upon completion of the boat, to test and determine the efficiency of his work to the satisfaction of the department, both by trials at dock and under speed or other tests as may be determined upon; and should any faulty construction, defects, or deficiencies in any respect be found or develop they are to be satisfactorily corrected by the contractor. The machinery is to be operated at the dock until all bearings are in good condition and machinery and engines can be run continuously at full speed without heating of any journals or bearings. The contractor will also set the date for the official trial trip of machinery and engines, informing the department at least six days previous to the date of the proposed trial in order that an official inspector of the department may be present.

The speed trial will be preceded by runs to standardize the propellers, this to consist of driving the vessel six or more round trips, as directed, over a standard measured mile course at various speeds above and below the required speed, from which trials a curve of speed and revolutions per minute will be laid down. The vessel will then be given a continuous run in free course water for two consecutive hours at full speed without heating of journals, the mean revolutions per minute for the two hours being used on the curve of revolutions previously determined to ascertain the actual speed developed by the vessel, which it is anticipated will equal or exceed 10 statute miles per hour.

The engine contractor shall furnish all necessary experienced attendants to observe and take the necessary data, revolutions per minute, etc. Indicators or counters and the necessary work-gear attachments shall be provided on the main engine to accurately give revolution readings during each trip of the standardization runs and during the speed and endurance trial. The fuel consumed per hour during the trial trip and engine test run, as well as the chemical and calorific value of the fuel, shall also be accurately ascer-

tained; and all methods of obtaining the required data by the contractor and assistants shall meet the approval of the department.

The start will be made with the engine settled to good working condition, and the boat must float at its load draft, the necessary weights to fulfill this requirement being placed on board by the contractor and removed after trials are completed. All moving parts of the engine and attachments must run smoothly and without shock or noise. There shall be no tendency of bearings to heat or grip, and should any defects be developed subsequent trials shall be made until all the machinery is in satisfactory working order. The piping systems and all connections shall be tested and proven perfectly tight and satisfactory. The electric-light generator and all other separate auxiliaries will be tested and proven satisfactory. The contractor will furnish every facility to the Government inspector for the observation of conditions during these trials and for the taking of any required data.

The contractor shall furnish, fit, and connect, ready for use, all instruments necessary for the taking of trial data and shall bear all expenses of the trials. All data taken on the trials shall be accurately worked up, properly tabulated, and the usual various curves for horsepower, revolutions, speed, etc., determined; and all promptly delivered to the department, the tables and curves being made on tracing linen.

The engine and auxiliaries will be opened up after the trial trips; bearings, cylinders, and all such parts carefully examined, and any parts found defective made good.

7. Inspection.

All work and material entering into the construction of the boat and its machinery, also all fittings supplied, shall be subject at all times to the inspection of the officer in charge or inspectors designated for supervision of the construction; and any imperfect materials or fittings must be replaced and errors of construction amended as required to satisfactorily meet the requirements according to the true intent and meaning of these specifications.

Every facility will be afforded inspectors for the prosecution of their work, and the contractor will be required to furnish a suitable room or office, with desk, drawing board or table, chairs, etc., for use of the department's representatives.

8. Drawings.

The drawings descriptive of the general character of this vessel are shown by the reduced scale drawings attached as the frontispiece of this volume, larger sized drawings being furnished as requested.

All detail drawings necessary for the construction of the boat and all of its machinery will be furnished by and at the expense of the contractor as directed and approved by the department, which must be furnished with four blue prints of each drawing before work is performed. One copy of same will be returned to the contractor with comments and corrections marked thereon, one copy similarly marked will be furnished the local inspector, and one copy to the contracting officer. The drawings which are furnished by the department as a part of these specifications and which are termed "type plans" are simply to give a general idea of the character of the boat desired, the general dimensions, internal arrangements, accommodations, etc., and any modifications of these plans suggested by the contractor must be approved by the department. Should it appear necessary or desirable in the course of construction to make any changes of arrangements or detail such changes shall be made by the contractor without extra charge, providing that the general character and style of



work specified is maintained and provided that the work has not already been executed. (See also paragraphs 324 and 334.)

One complete set of brown and white prints and four sets of blue prints of all drawings showing the work as actually performed on the boat will be furnished by the contractor within 30 days after final completion and acceptance of the vessel.

The hull of the boat will be built on first-class lines for bay and sea service; the contractor, however, will be required to determine the exact lines on which to build to fulfill all requirements, displacement, draft, speed, etc. As soon as the fairing of the lines is completed upon the mold-loft floor a tracing on scale of one-half inch to the foot showing the faired lines and displacement in tons to load line, together with a complete detail estimate of all weights entering into the construction of the boat machinery and equipment, must be forwarded to the department for approval. The dead weight to be carried in addition to complete equipped boat as specified will be approximately 4 tons, including fuel, water, stores, etc.

There shall also be furnished by the contractor copies of the approved drawings or blue prints of all essential plans and details to the inspecting officer for transmission to local inspectors of the United States Steamboat Inspection Service, and as required by the rules of that service. (See also paragraph 8. of Rule VI, United States Steamboat Inspection Requirements of 1926.)

9. Photographs.

The contractor shall also furnish the department with two copies of each of the following-named photographs of the boat:

One view to be taken on the 1st day of each month after the keel is laid; one view to be taken as the boat leaves the launching ways; one view to be taken when the boat is completed ready for delivery, this picture to illustrate a broadside view taken opposite position of amidships.

The negative of each photograph shall show the date of taking same, the name of this vessel, name of contractor, and subject or title of the photograph, as "Third month after keel laying," and finally name of the photographer.

All prints will be 8 by 10 inches, cloth mounted, with a 1¼-inch cloth binding edge on the 8-inch left-hand side, except view of the finally completed hull, which should be approximately 14 by 17 inches and mounted on cardboard. All photographs to be first class in every respect.

10. Half Model.

A neatly finished half model to scale of one-half inch per foot shall be made by the contractor and painted to conform with the finish colors of the boat, neatly smoothed and mounted on a backboard of natural wood finish. The fenders, rudder, rails, and stern frame shall be fitted to the model. The deck fittings, houses, etc., will not be required. On the mounting board will be painted the name of the vessel and the shipbuilder's name. This model to be securely crated and delivered to the "Office of the Quartermaster General, War Department, Washington, D. C."

11. Materials.

All wood used in the construction, as hereinafter specified, must be naturally and thoroughly well seasoned, selected, and free from all objectionable defects, sap, knots, splits, windshakes, etc.

All fastenings to be of galvanized iron and composition, as required. All composition castings, unless otherwise specified, to be of naval brass, 62 per cent copper, 1 per cent tin, and 37 per cent zinc, or gun metal, 88 per cent,

copper, 10 per cent tin, and 2 per cent zinc, as required. Managanese bronze where specified to be "Parsons" or equal. All other materials to be of the best throughout for hard service and long life.

All materials must be properly cared for at all times and be kept under cover or stowed as required by inspector in charge.

12. Workmanship.

The workmanship throughout, of every description, to be of the best and most thorough character, and, unless otherwise specified, fully equal to the requirements of the American Bureau of Shipping for vessels of this small harbor-boat type, particular care being taken to insure fair lines, smooth surfaces, and perfect water-tightness of all parts of the hull, houses, etc.

It is also the intention that all machinery and fittings entering into the construction of this boat shall be strictly first class; that the pumps, engine, electric plant, and all appurtenances and fittings throughout shall be installed complete in all details and fully equal to or in accordance with the rules of the American Bureau of Shipping and the general rules and regulations prescribed by the United States Board of Supervising Inspectors of Steam Vessels, as last amended, in so far as applicable.

13. Care of Vessel.

All dirt, chips, and scrap material shall be cleaned out daily, in the discretion of the inspector, and no water allowed to remain in the vessel. The vessel must be clean throughout when delivered to the Government.

Injuries resulting from launching, collision, grounding, docking, corrosion, or other causes, prior to acceptance by the Government, shall be made good by the contractor.

14. Articles Furnished by the Government.

The Government will furnish, without cost to the builder, the articles mentioned below, delivery being made by the Government f. o. b. the freight station or siding named by the contractor in his proposal.

Flags.

Navigator's instruments and outfit.

Curtains.

Taffrail log.

Anchor and anchor chain.

Tools and supplies, except as required of the contractor by the detail specifications.

The Government will also furnish, without cost to the contractor, the items of outfit customarily included under the headings of boatswain's stores, paints, oils, etc., carpenter's stores, cabin outfits, navigator's stores, engineer's stores, and electrical stores. This information is given that bidders need not include such items as part of their cost of construction. The above-mentioned outfits will be handled wholly by the Government, and the contractor will not be required to incur any expense in connection therewith, except storage space at his yard.

15. American Bureau of Shipping.

The contractor will be required to submit all necessary detailed drawings of hull construction, and before proceeding with the work such drawings must receive the approval of the American Bureau of Shipping and the chief of transportation service, office of the Quartermaster General. The Government will bear all the expense of examination by the American Bureau of Shipping

of the plans and materials proposed for the construction; and, on completion, the expense for rating or classification by this bureau.

The details of the Diesel engine plant shall likewise be submitted to the American Bureau of Shipping for approval, in accordance with their published regulations. The proper quantity and apportionment of equipment attached to this vessel shall also be submitted for the approval of this bureau.

16. United States Steamboat Inspection Service Requirements.

This vessel must be built to conform in all respects with United States laws, to all regulations as provided for such craft in the Pilot Rules of the Department of Commerce, page 22, of December 1, 1924, edition; Rules for Lights; and the United States Steamboat Inspection Rules, River Vessels, 1926 edition; in regard to bulkheads, lifeboats, life rafts, life preservers, and fire apparatus.

The War Department desires to fully cooperate with the Department of Commerce in seeking to have carried into effect all the requirements of the Steamboat Inspection Service. Therefore, with this in view, the contractor will extend every facility to inspectors of that service to make examinations of the vessel, tests of metals and fittings as required, and to supply all blue prints of details as may be requested in connection therewith.

In accordance with the Regulations of the United States Steamboat Inspection Service for River Vessels, published April 6, 1926, it is required that the vessel contractors prepare and submit to the inspecting officer of the War Department, for transmission to the local United States steamboat inspectors of the district where the vessel is to be inspected, drawing or blue prints, in plan and section, showing fully the general construction of the vessel, of wood, iron, or steel, including dimensions, spacing of frames, disposition of hull plates, outside and in, or of outside and inside planks, construction of decks, construction of transverse and longitudinal bulkheads and location of same, space between decks, and details of principal scarfs, and shall also furnish a statement of the shapes, dimensions, and unit weights of all structural parts of the hull and of the kinds of material of which made, including kinds of wood. A full description of the riveting of all parts of an iron or steel hull shall be furnished.

The drawings or blue prints and description of the vessel shall be retained in the office of the local United States steamboat inspectors making the first inspection of the vessel.

This vessel, being a United States Government vessel, is not required by law or regulation to carry certificates or licenses of the Steamboat Inspection Service, yet it is the intent of the War Department to have fully carried into effect all such laws and regulations as would properly pertain to this boat if it were classed in the merchant marine.

Any expenses which may be incident to travel, accommodations, and subsistence of the United States steamboat inspectors while on this work of inspection will be entirely borne by the War Department.

CHAPTER 2

GENERAL HULL CHARACTERISTICS

25. Keel.

To be of select white oak, 10-inch sided and molded, in one length, fastened in each frame with one $\frac{3}{4}$ -inch galvanized-iron bolt clinched over ring. Shoe of oak, 10 by 2 inches, fastened with 6-inch galvanized-iron spikes, staggered, and spaces 12 inches center to center.

26. Stem.

To be of white oak, side 10 inches, and molded as shown, rabbeted to receive plank ends, through fastened to apron with 1-inch galvanized-iron bolts spaced 15 inches center to center. The stem to be tapered from the rabbet to 3 inches in thickness at forward edge, the face of stem to be covered with a composition band $\frac{1}{2}$ inch thick extending from top of stem to below the fore foot, fastened with 6 by $\frac{5}{8}$ -inch galvanized track nails.

27. Apron.

To be of select white oak, 12 by 10 inches, connected to the keel by an 8-inch natural crook knee securely fastened with galvanized-iron bolts.

28. Stern Post.

To be of white oak, 10-inch sided and molded, tenoned into keel and fastened to deadwood and keel with 1-inch galvanized-iron bolts. After edge to be tapered above and below stern bearing to give a fair fit to the stern post bronze casting and thus affording an easy flow of water to the propeller.

29. No Rudder Post.

The place of a rudder post is taken by the rudder shaft, which shaft at its lower end, or pintle, steps into the bronze skeg casting, as shown in drawings.

30. Skeg or Shoe.

The extension of keel forming rudder skeg or step shall be fitted between stern post and rudder shaft to consist of a phosphor or manganese bronze casting of proper section and extending up onto stern post. The cheeks of this casting shall extend well forward of stern post to form the deadwood. The top of this bronze casting to be well spread to secure a proper hold upon the planking. Countersunk bronze bolts shall secure this casting vertically and horizontally.

31. Rudder.

To be of the balanced type, and designed to be either a bronze casting, as shown, or a bronze $\frac{1}{4}$ -inch plate secured between arms of a rudder spider of bronze. Rudder weight to be hung on a composition bearing at upper end, while lower pintle is carried in the rudder skeg, as shown. Quadrant of 2 feet 6 inches radius to be fitted on after side of rudder head on deck, with forged or welded iron spider brace arms, as shown, fitted with proper key into head of rudder stock, and 3 by 2 inch channel bars on rim of quadrant to receive the tiller ropes. Grating to be provided over quadrant, as shown. Provide a 5-

pound lead sleeve lining for rudder trunk, sleeve to be bedded in white lead, upper and lower ends to be flanged over and securely tacked. Lower end of rudder trunk to be formed with a flanged brass casting, as shown.

32. Rim Log.

Rim log to be of selected Georgia pine, 18 by 12 inches, rabbeted to receive planking and decking, fastened with 1-inch galvanized-iron bolts driven 14 inches center to center.

33. Deadwood.

To be of select oak, 10-inch sided, through fastened with $\frac{3}{4}$ -inch galvanized-iron bolts, driven 14 inches center to center. Seams to be stopwatered at plank ends.

34. Shaft Log.

To be of clear oak, 12 by 10 inches, made in two depths or layers, with tongue tightly fitted in grooves between them, fastened to keel and deadwood with $\frac{3}{4}$ -inch galvanized-iron bolts spaced 14 inches center to center. The shaft log to be bored and lined with lead or copper pipe flanged over, making water-tight connections at each end.

35. Horn Timbers.

To be of select oak, 12 by 6 inches, extending from sleeve log to rim log, let into the latter about 3 inches, fastened with $\frac{3}{4}$ -inch galvanized-iron bolts driven through frame and clinched over rings.

36. Frames.

To be of good clear oak, double, sawed to shape, care being taken to have straight grain at all points. Frames to be sided $2\frac{1}{2}$ inches and molded $7\frac{1}{2}$ inches at heel, sided $2\frac{1}{2}$ inches and molded 6 inches at deck with 8 inches for body of the frame and spaced 18 inches center to center. Double frames to be side fastened with $\frac{5}{8}$ -inch galvanized-iron screw bolts. Proper limbers to be provided; also, limber chains of composition.

37. Keelsons.

Center keelson to be of select Georgia or Oregon pine, in one length from the deadwood diagonal to apron, sided 10 inches and molded 8 inches, fastened with one $\frac{3}{4}$ -inch galvanized-iron bolt in each frame, driven through the frame and keel.

Sister keelsons, one on each side of center keelson, to be of select Georgia or Oregon pine in one length, 8 by 6 inches, fastened with one $\frac{3}{4}$ -inch galvanized-iron bolt in each frame, driven through frame.

38. Engine Girders.

Of select oak, 12 by 12 inches, fastened to each frame with one $\frac{3}{4}$ -inch galvanized-iron bolt, driven through and clinched over rings, and two girders sided 6 inches, and molded as shown, with deep cross floors of Georgia pine, 9 by 5 inches, extending to sides of vessel, all properly and tightly fitted and securely fastened in place.

The engine foundation shall be constructed in a most thorough manner to secure a firm and solid foundation and to distribute the strains evenly throughout the hull to minimize vibration.

39. Outside Planking.

All planks to be in long lengths and of clear Georgia or Oregon pine (or fir). Sheer strake, 12 by 3 inches, fastened through clamp with $\frac{5}{8}$ -inch galvanized-iron screw bolts. Planking from sheer strake to turn of bilge,

6 by 2 inches. Broad planks under bottom to be 10 by 2 inches, tapered to each end. First garboard to be 12 by 3 inches and second garboard 12 by 2½ inches. Fastenings in 2-inch planks to be 5-inch galvanized-iron spikes, two in each frame; in 2½-inch planks 6-inch galvanized-iron spikes, two in each frame; in 3-inch planks 7-inch galvanized-iron spikes, three in each frame. All spikes above the water line to be set in and plugged with deck plugs set in white lead; all spikes below the water line to be set in and cemented. Seams of outside planking to be caulked with one thread of cotton and one thread of oakum, garboards and wood ends one thread of cotton and three threads of oakum, and all painted, payed, and filled perfectly flush with best lead putty.

The entire outside planking to be planed and scraped fair and smooth in an approved manner.

40. Hull to be Copper Sheathed.

The bottom of hull, after being planed fair and smooth and well painted with three coats of approved paint, will be coppered to 6 inches above load-water line with 18 ounces per square foot pure copper sheathing (16 or 17 ounce copper will not be accepted) over tar felt, the sheathing being thoroughly secured with copper nails 1½ inches long. The oak shoe on bottom of keel, specified elsewhere, will be securely fastened after the copper has been placed.

41. Bilge Keels.

Bilge keels of oak, 6 by 4 inches, about 25 feet long, tapered to 2 inches on outer face, will be securely bolted to hull planking and frames along under each bilge amidships.

42. Clamps.

To be of select Georgia pine, 10 by 4 inches, fastened with ¾-inch galvanized-iron screw bolts and two 8-inch galvanized-iron spikes in each frame.

43. Ceiling.

The interior of the hull throughout the launch will be sheathed with select Georgia pine, three strakes 8 by 2 inches, seven strakes at the bilge 6 by 3 inches, and three strakes on the bottom 9 by 2 inches. The 2-inch ceiling to be fastened with two 5-inch galvanized-iron spikes in each frame, and the 3-inch ceiling with two 7-inch galvanized-iron spikes in each frame. The sheathing, as well as the hull planking and frames, to be thoroughly painted as specified in item No. 38, before the sheathing is fastened in place. For purpose of ventilation, the top strake of ceiling below the clamp member will be omitted, and for purpose of access and ventilation two strakes of ceiling will be left out on each side of center inside keelson.

44. Deck Beams.

To be of select Georgia or Oregon pine, 6-inch sided and 8-inch molded, tapered at ends to 6-inch sided and molded. Heavy beams of pine, sided 8 inches and molded 8 inches, tapered at ends to 8-inch sided and 6-inch molded, spaced as shown on plan, each end to be fastened to clamp with two ¾-inch galvanized-iron bolts. Alongside deck houses and cockpit the beams will dovetail into stringers of select Georgia or Oregon pine, 8 by 10 inches. Deck beams to be crowned 2½ inches in 14 feet 6 inches.

45. Knees.

There will be four 5-inch natural crook knees of oak or hackmatack on each side under deck beams, fastened with seven ¾-inch galvanized-iron bolts in each knee clinched over rings; also, four at towing bitt aft, as shown; also,

two on each side, placed horizontally under deck, as shown. If oak knees of proper dimensions are not readily obtainable, consideration will be given for the use of steel-plate gussets with angle-iron flanges.

46. Fender Guards.

To be of oak, the upper one 8 by 4 inches, on a level with the top of deck beams, and to extend entirely around the boat, except at the steel bow plates, fastened in each frame with one $\frac{3}{4}$ -inch galvanized-iron screw bolt and one 8-inch galvanized-iron spike; facing to be of tough white oak 7 by 2 inches, fastened with 6-inch galvanized-iron spikes spaced 10 inches center to center. Heads to be countersunk and finished flush. Lower guard of oak, 5 by 2 inches, faced with oak, 4 by 1 inch, extending well aft, as shown. Fender iron on upper guards to be 6 by $\frac{3}{8}$ inch, and on lower guards $3\frac{1}{2}$ by $\frac{3}{8}$ inch, fastened with 4 by $\frac{1}{8}$ inch track nails. Whisker iron on forward end of each fender of $\frac{3}{8}$ -inch plate with 4 by $\frac{1}{8}$ inch track-nail fastenings. Heads to be let into guard and plugged.

47. Steel Bulkheads.

To be three in number, located on frames Nos. 7, 24, and 35, all constructed of steel plate $\frac{1}{8}$ -inch thickness. (See special detail description.) A stuffing box will be fitted on counter or extension shaft and bolted to it at bulkhead on frame No. 24. The bulkhead plate will be clamped between the two oak frame members. Ceiling strakes will stop at the bulkheads with filling pieces to accommodate variations in ceiling, with an insertion of canvas and white-lead cement on each side of the steel plate. The galvanized bolts binding frames to bulkheads will be spaced at 8-inch centers. Steel bulkheads will be cut for passage of stringers and keelsons, and openings, so formed, will be made water-tight by well-formed stapling of angle irons, as shown. Stiffeners, 2 by $2\frac{1}{2}$ by $\frac{1}{4}$ inch angles, to be riveted on each side, horizontally and vertically, as shown.

48. Fuel Compartments.

The space below pilot house, or compartment No. 2, under deck, will be arranged for fuel and water tanks. Iron trays to be provided under tanks and made perfectly oil-tight. Suitable drains with valves to be provided. Any connections from tanks passing through lining of trays must be made up perfectly oil-tight against lining. From the upper and lower portion of tank compartment will be installed vents of 2-inch galvanized-iron pipe at the forward and after ends. These vent pipes to be fitted with suitable return bends at upper ends, with wire gauge insertion, to admit of free ventilation, but to prevent admittance of weather or water as much as possible, and be made perfectly water-tight where they pass through deck. Where this pipe passes through the pilot house the iron pipe to be replaced by brass pipe of same diameter.

49. Water Tanks.

Located where shown, of cylindrical form and dimensions, as shown, having a total capacity of about 200 gallons, to be constructed of $\frac{1}{8}$ -inch galvanized best charcoal sheet iron, double riveted, and made thoroughly water-tight and provided with proper number of handholes, vents, and suitable perforated partitions of swash plate of No. 12 galvanized iron, all thoroughly well and strongly built and proven tight under a pressure test of 25 pounds. Tanks will have filling pipes from composition casting on deck, fitted with flush plate cover of composition, also equalizing pipes, etc.

Tanks to be well supported and securely fastened in place.

50. Plank Sheer.

To be of clear Oregon or Georgia pine, 10 by 3 inches, fastened with three 7-inch galvanized-iron spikes in each beam; heads to be plugged in white lead.

51. Deck Planks.

To be of dry, well-seasoned, clear Oregon or Georgia pine, vertical grain, free from all defects, $2\frac{1}{2}$ by $2\frac{1}{4}$ inches, without butts except at sides, as necessary, nibbed at forward end into king plank of Oregon pine and fastened with one 5-inch galvanized-iron spike on each beam, plugged in white lead. Seams to be caulked water-tight with two threads of cotton, puttied with marine glue, and then given a coat of best linseed oil. King plank in after deck, from rear of cabin to stern.

52. Bulwark.

A solid bulwark of select Georgia or Oregon pine, 6 inches on deck, tapering to 4 inches on top and 12 inches high at stem and taffrail, fastened with $\frac{3}{4}$ -inch galvanized-iron bolts, spaced 15 inches center to center, to extend entirely around main deck. The rail on top of bulwark to be of oak $5\frac{1}{2}$ by $2\frac{1}{2}$ inches, fastened with 5-inch galvanized-iron spikes, spaced 12 inches center to center, plugged in white lead. Rail to be protected with two fender irons $1\frac{1}{2}$ inches wide by $\frac{1}{4}$ inch thick, half oval section.

A sufficient number of scupper openings of galvanized iron or white metal, 6 by 3 inches, to be provided in bulwark to free deck of water. Scupper openings to be laid in thick paint.

53. Handrail, Portable.

A portable rail on top of bulwark, abaft pilot house, to be arranged as shown on plans. Stanchions to be forged and galvanized, 18 inches high and spaced about 40 inches apart, so designed at base as to lock in place and be readily removable when desired; stanchion plates to be flush. Through the eyes at the upper end of stanchions $\frac{1}{2}$ -inch diameter galvanized-wire rope will be rove and made fast to countersunk eyes at the forward ends.

54. Cabin Fittings.

The troops' cabin aft to be supplied with lattice settees or transoms as shown. Side of the settees will have hinged backs, constituting hinged doors to the wing lockers. These lattice seats to be readily removable in sections to form the locker covers. Lockers will be formed under all settees and access thereto to be had by lifting the covers as indicated. The back of the after settee will have sliding doors to a shallow locker back of this settee, essentially as shown.

A portable folding table, 3-foot square top, will be supplied and arranged with cleats or hooks for stowing overhead when not in use.

55. Chocks and Cleats.

There will be one bow chock mounted in the rail on each side for mooring rope, as per special design shown, for insuring that the rail forward will be left without obstruction. (See also par. 92.)

There will be nine 5-inch ring bolts on each side of boat, securely fastened to the bulwark for holding fenders, and five deck ringbolts on each side, to be let into deck flush, and two 12-inch cleats on each side of cockpit fastened to the coaming of same. Cleats and ringbolts to have large bases; ends of horns of cleats to stand well out.

All chocks, ringbolts, and cleats to be galvanized.

56. Steering Gear.

The steering wheel in pilot house will be of mahogany rim and spokes, about 48 inches in diameter, over the handles properly finished and mounted on a bronze pedestal. Rope drum and gear wheels to be located below the pilot-house floor or in No. 2 compartment, to be of cast bronze, mounted on composition shafts with all necessary supports, as shown; boxes, fastenings, etc., to be of composition; boxes to have oil holes.

All parts and connections to be placed in convenient places for easy examination and repair. The ropes fore and aft to be led along inside of cabin trunk. Steering-gear leads to be of galvanized flexible wire rope (except in pilot house, where it will be of bronze), with fair leads at quadrant and alongside as necessary. Fair lead pulleys to be fitted with roller bushings. Composition turnbuckles to be provided for taking up slack. (See item No. 119, Engine Control and Steering Gear.)

57. Painting of Hull.

Above the water line the boat is to be painted with three coats of best lead and zinc paint, standard war color of light battleship gray. The hull below the water line will also receive three coats of best paint of make as approved, after which the copper sheathing will be applied.

All portions of the work which are covered up during the process of construction are to be carefully and well covered with approved paint before being so covered. The entire interior of the hull, butts, laps, sheathing, underside of deck, concealed uprights, stringers, clamps, keelsons, deadwood, etc., are to be painted with two coats best lead and oil.

JOINER WORK

58. Cabin Trunk.

To be about 23 feet 6 inches long, with sides 30 inches from sides of boat, the after end of cabin to stand vertical and be straight athwartships. The height above deck to be 46 inches, as shown. All fastenings to be of galvanized iron. Corner posts to be constructed as shown on drawing; studs to be of pine $2\frac{1}{2}$ by $2\frac{1}{2}$ inches, tenoned into sill and plate, and spaced as shown; sill set on beams to be of Georgia pine 9 by 5 inches, tapered to 4 inches, and worked to form shown; plate $4\frac{1}{2}$ by $2\frac{1}{2}$ inches. Sides and ends to be sheathed with pine ship lap 3 by $\frac{7}{8}$ inches when dressed, with five 12-inch brass framed air ports on each side, and one port on after end, located where shown. Companionway slides to be of oak and doors also of oak (quarter sawed) paneled, location, form and dimensions as shown, carefully and strongly built. Brass slides and guides. After end of cabin to be constructed substantially the same as sides. Beams of cabin to be $3\frac{1}{2}$ by 2 inches, enlarged at hatches and skylight and of ash or oak, all worked with same crown as deck, spaced as shown on drawings and dovetailed into plates. Decking over cabin trunk to be of Oregon pine 3 by $\frac{7}{8}$ inches when dressed, tongued and grooved, and beaded on underside. The top of deck is to receive two coats of white lead and oil paint and to be covered with No. 5 cotton canvas in one piece, laid in thick white lead to securely cement canvas to deck, fastened with 10-ounce galvanized tacks, and then painted with three coats of best oil paint of approved color. Margin plank of Oregon or Georgia pine 7 by 2 inches. Triangular cant strips to be fitted around margin, skylight, etc., each to be properly fastened and bedded in thick white-lead paint. Canvas to be fitted under cant strips; also, to completely cover same, to which it will be tacked, care being taken that the upper joint shall be covered so as not to admit moisture.

The floor throughout to be 3 by 1½ inch pine, tongued and grooved, supported by floor beams of pine or oak 4 by 3 inches, carried on stringers at sides, spaced as shown on drawings, and with portable sections to admit of getting at bilges and shafting, etc.

Three 1¼-inch inclosed lead scuppers with copper strainers will be fitted on each side, extending within 6 inches of main deck, to drain water from cabin roof—one at fore side of slides, one at after side of slides, and one at each after corner. Galvanized-iron rail in forged supports entire length on top of cabin margin, both sides, 3 inches high.

59. Pilot House.

To be constructed forward of cabin trunk, about 8 feet 3 inches long by 9 feet wide and 8 feet in height from top of main deck, with doors of mahogany on each side, and windows as shown on drawings, arranged to slide up and down, except that the rounded windows will be immovable. Windows to be glazed with best quality treble thick, clear and true, white glass at least 1½ inch thick; sashes to be fitted with heavy brass lips at bottom setting over brass locks on sill, these sashes to be of mahogany and of form and dimensions as shown, carefully and strongly built. Bottom of pockets to be lined with lead and fitted with drains to carry away water; backs and sides of these pockets to be faced with canvas properly painted. There will be four windows of approved size at after end of house, with the two outer windows arranged to slide athwartships. Sill coaming, plate, and exterior finish to be substantially the same as for cabin trunk. Studs to be 4 by 2½ inches. Holding-down bolts of ¾-inch galvanized iron (except those within 6 feet of the compass, which will be of composition), to be provided from top of house to securely fasten the house to the main deck. Interior to be sheathed with 3 by ½ inch tongued-and-grooved pine or ash, run vertically below windows. Beams and decking of this house, also canvas covering, to be the same as specified for cabin trunk. Forward of the steering wheel will be fitted a suitable shelf with ledge and all necessary chocks or brackets, and furnished and fitted on this shelf shall be a "Ritchie" or equal spirit compass, with 5-inch card, with brass binnacle top and stand. The compass will be properly adjusted after trial trips have been made. Two inclosed lead scuppers are to be worked to drain water to main deck, one on each side at lowest points. All metal work about pilot house, except scuppers and as otherwise specified, to be of composition. An oak grating, brass fastened, will be provided as a platform for pilot, as shown.

A hinged chart board of hardwood and rack for holding charts will be fitted at after end of pilot house. Suitable engine signal bells, with substantial bronze pulls, chains, fair-leads, etc., complete.

The pilot house will also be fitted with lattice settee seat, as shown. Brass speaking-tube connection between pilot house and engine room; also between the flying bridge and pilot house.

A companionway with hardwood steps to extend from pilot-house floor to engine-room floor with Mason safety treads of brass and lead, also brass nosings. Galvanized-iron grab rails to be fitted on each side of doors outside and down one side of companionway. Floor 3 by 1½ inch tongued-and-grooved pine and covered with heavy linoleum carefully laid and well fitted and secured.

All interior woodwork to be varnished with three coats of best varnish after being thoroughly filled; varnish to be rubbed to a dull finish. Deck and beams overhead to be painted three coats of best white-lead and zinc paint.

60. Troops' Cabin.

To be fitted up aft of engine room, extending full width of cabin trunk, and about 8 feet 3 inches fore and aft, with companionway in after end and a portable hardwood ladder fitted with safety treads of brass and lead to same. At sides and after end there will be transom seats of pine with lockers underneath. Seats to be of close lattice work and properly fitted to body curve. All interior woodwork to be finished as specified for engine room. Bulkheads dividing engine room and troops' cabin and inclosing troops' toilet to be $\frac{3}{8}$ -inch galvanized-steel plate with doors, as shown, neatly paneled. Doors to have heavy brass locks and fittings. Eight heavy double brass coat hooks to be attached high on cabin side.

Floor of cabin and toilet to be covered with heavy inlaid linoleum, carefully laid and well fitted and secured.

Portable sections or hatches in the floor of cabin as required for free access to spaces below.

61. Machinery Space.

The space between bulkheads on frames Nos. 13 and 24 will be arranged for engine compartment. All interior woodwork to be finished in varnish. Deck and beams overhead to be painted white. A seat locker will be constructed on starboard side, seat cover to be mounted on heavy strap hinges of brass. An engineer's locker to be constructed with paneled door in convenient location; door to be hung on strong brass hinges and fitted with Yale mortise lock and brass catch and knobs. Heavy brass double coat and hat hooks, eight in number, will be installed in locker.

A rolled steel corrugated or diamond pattern floor plate, crowned as required, will be provided to cover clutch for countershaft, in case same projects above the floor. Floor in engine room will be fitted closely around engine with diamond pattern steel floor plates provided as required for this purpose and carried on steel angles $2\frac{1}{2}$ by $2\frac{1}{2}$ inches. The steel floor plates to be made in small removable sections, in order to secure quick access to pipes and to the bilges below.

Tool racks to be provided as necessary to properly provide for all tools called for in these specifications. Over the engine room on upper deck there will be furnished and fitted one kennel top, removable, mahogany skylight, as shown, having a clear opening of about 6 feet 2 inches by 3 feet 3 inches, with substantial coamings. The leaves are to be hung on heavy composition rods and have brass watercourses under them, secured to ridges and discharging on deck. Particular attention must be paid to design of this skylight to make it thoroughly water-tight in every respect. Approved composition lifting gear to be installed for each shutter and arranged for operating from below. Beams will not be cut at skylight opening.

There will be a light portable ladder from engine room to main deck on both port and starboard sides, as shown; ladders to be hinged and portable.

At the after end of the engine room there will be constructed, as shown on plan, toilet room with entrance from troops' cabin. Bulkheads inclosing this toilet to be the same as specified for troops' cabin. Room to be fitted with a "Sands Knockabout" plate S-34, or other approved first-class yacht pump water-closet with hardwood seat and cover, with heavy trimmings all nickel plated, also a Sands or equal first-class nickel-plated folding hand lavatory, plate S-150, with pump connected to water tanks forward. Bevel plate-glass mirror about 12 by 18 inches, set in nickel-plated brass frame, with solid water-proof backing, all especially made for marine use, and provided with bulkhead flanges, will be installed over lavatory. Nickered brass toilet rack with toilet-

paper holder, each of approved pattern to be also provided and installed on bulkhead.

62. Cockpit.

Coaming on all sides to be of pine, about 14 inches high above deck by 4 inches, tapered to 3 inches, finished on top with rail of oak, $4\frac{1}{2}$ by $2\frac{1}{2}$ inches, with two galvanized fender irons on top $1\frac{1}{2}$ inches wide by $\frac{1}{4}$ inch thick, half oval in section. Three heavy portable covers of pine to be provided over cockpit, with means for securing same in position. The central cover to be formed with a sliding hatch cover, as shown, for purpose of access to the cockpit. The joint between the central hatch board or cover to be formed of a bent-over unequal legged angle iron, forming an inverted trough over the angle iron placed on edge of the next hatch board. There is to be pressed into the trough a rubber, so as to thus form a water-tight joint.

Staving at sides of cockpit will be of hardwood, $\frac{3}{4}$ inch thick by about 3 inches in width, tongued, grooved, and beveled, and to extend from floor to underside of coaming rail.

In the cockpit there will be a table built on which to rest the distribution box, of rigid construction, strongly supported and braced, its location being as shown on drawings. Around edge of table a strong ledge of galvanized iron will be provided to prevent distribution box from sliding off table. The table top will be of a size to accommodate the distribution box and will be covered with $\frac{1}{8}$ -inch galvanized-steel plate, securely fastened in position, the planking under this plate being given three coats of best lead paint before plate is put on.

Cockpit floor is to be of tongued-and-grooved pine, 3 by $1\frac{1}{2}$ inches, supported on beams of pine 5-inch molded and sided $2\frac{1}{2}$ inches, spaced as shown on the plan, carried on strigger and stanchions as required at height shown. Cockpit floor will have drains overboard with self-closing valves, as required, and fitted with lead sleeves to carry off any water that may collect in cockpit.

At after end of cockpit there will be provided an access hatch to the hold compartment below, as shown, this small hatch to be arranged with a combing 3 inches high above cockpit floor.

Locker chest will be supplied for use in cockpit, or under deck, and elsewhere as desired, with suitable covers of strong construction, and the necessary racks for the storage of tools, small articles of equipment, supplies, etc., locker chests being provided with heavy brass hinges, latches, handles, locks, etc.

63. Brass Trimmings.

All doorsills, and such other places as is customary, to be covered with cast plates or No. 18 sheet brass, as approved, well fastened with brass nails or screws. Cast-brass plates of corrugated or diamond pattern, at least 3 inches wide, doubled, to be also secured with brass screws to deck in front of all entrances to cabin trunk to protect deck from excessive wear; safety treads, nosings, railings, as specified elsewhere, to be placed at all such places as required. Toe plates at all entrances, inside and out, to protect varnish and paint work.

64. Hardware.

All hardware used to be of finished brass, of heavy plain marine pattern, as approved, suitable and substantial in every respect. The contractor will supply and fit all locks, latches, window catches and lifts, clamp fastenings, knobs, hinges, doorstops, door hooks, and the like, as may be necessary throughout the vessel. Every lock to have two keys, fitted with brass tags plainly marked. Keyboards supplied and fitted as required.

65. Cleaning, etc.

All wood and iron work to be carefully cleaned before painting, and all chips, dirt, shavings, etc., must be carefully cleared from all compartments, particular care being taken that all foreign matter is removed and all parts thoroughly cleaned before the application of any paint.

66. Painting.

The interior of pilot house and cabins, except underside of roof, and all window sashes to be properly filled and finished bright with three coats best varnish and rubbed to a dull finish where required.

House decks where canvased will be painted as previously specified, and canvas will have three coats of required color.

All woodwork not finished bright to be painted with three coats of best lead and zinc paint. All fittings, etc., to be painted or varnished as directed.

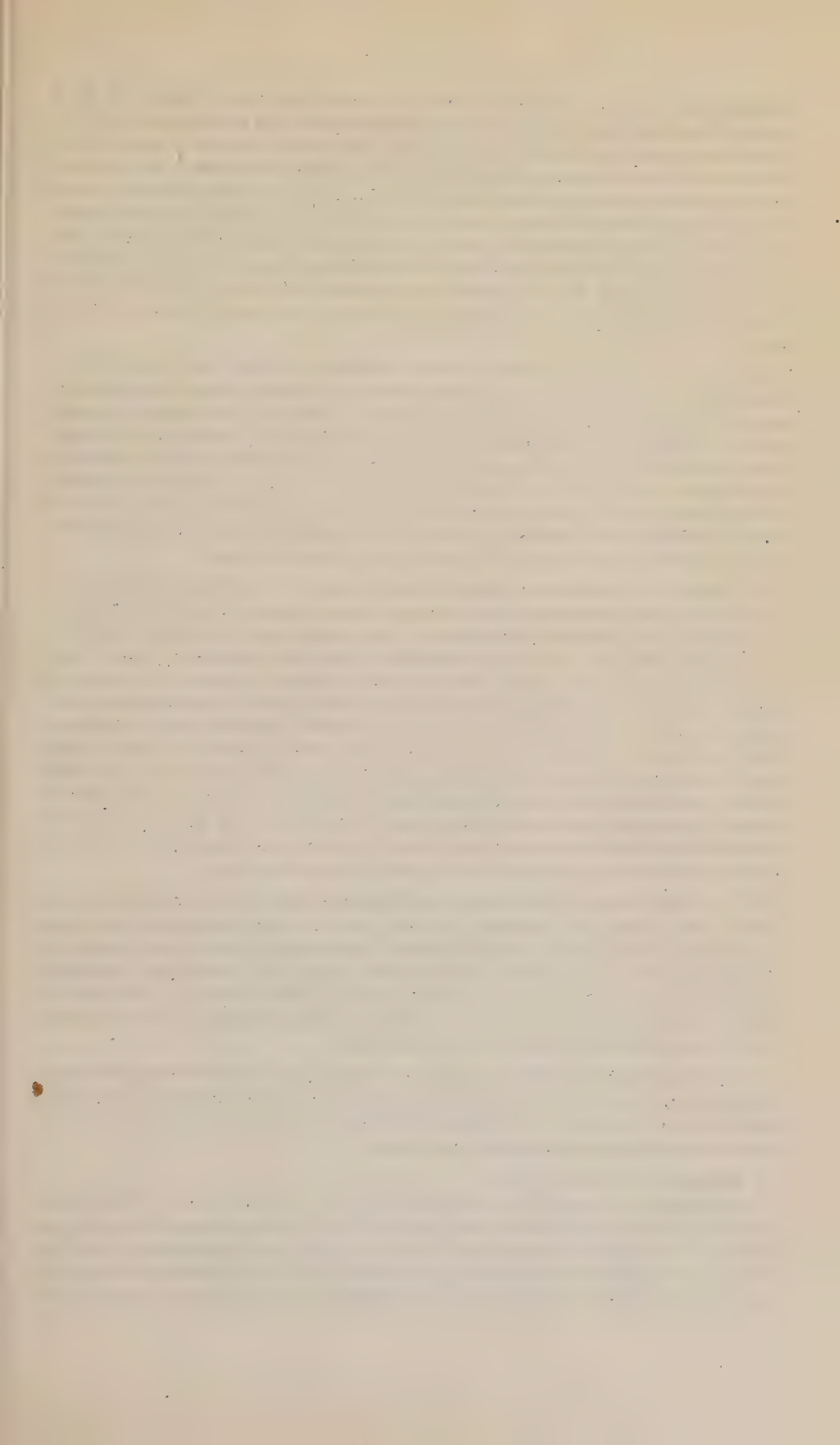
67. Protection.

The boat is to be constructed under a shed or suitable inclosure, protected from rain and sunshine while in course of construction, and the contractor will be required to properly protect the decks and other woodwork from injury by weather or workmen from time of launching until the boat is delivered to and accepted by the Government.

68. Military Mast.

A steel military mast about 37 feet extreme length by 8 inches square, formed from 8-inch H beams of Carnegie or equal, 32.6-pound section, with the central web facing athwartship. This mast will be stepped on a suitable steel foundation in bottom of boat, as shown, which in turn will rest upon a fore-and-aft timber resting on top of the keelson and extending from frames 26 to 32. The mast will be firmly stepped and tightly wedged at the deck, the wedges being carried on two special deck frames, made of steel $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{3}{8}$ inches by 5.9-pound angles. One frame above deck and one below deck, as shown, the steel H-beam mast being boxed in opposite the wedges by plating and angles, as shown. At the hounds, rods will pass through from H-beam flange to flange, with suitable forged lugs for attaching shackles or shrouds, and topping lift hoist to boom will be secured to masthead, as shown. A fife rail band with four belaying pins about 10 inches long will be clamped between the flanges of the mast in the position shown; this band will be about $2\frac{1}{2}$ by $\frac{1}{2}$ inches, with rivets or bolts through ends of the same. The central web of the mast will be cut away opposite the end of the boom for a distance of 16 inches long by 5 inches wide, in order that the boom when stowed may pass through the mast. The outside flanges of the mast to be reinforced opposite this opening by two steel angles 3 by 3 by $\frac{3}{8}$ inches by 7.2 pounds, riveted back to back thereon, as shown. At the upper end of these angles there will be attached a steel fairlead sheave of at least 6 inches diameter, as shown. Below the location of the boom there shall be located a boom swivel casting of cast steel or bronze, as shown. This casting to be secured to the mast by a $\frac{3}{8}$ -inch steel plate riveted to steel angles $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{3}{8}$ inches by 5.9 pounds, which in turn are riveted to the inside of the flanges of the steel H-beam mast. The upper $3\frac{1}{2}$ feet of the mast, being the tapered portion, will be made by cutting off the H-beam flanges at the angles shown, while the taper through the web portion will be made by cutting a tapered V from the web, then by forcing this V closed, it will then be oxyacetylene or electric welded to thus form a tapered web or top to the mast.

69. Special Trolley Boom on forward side of mast, to be about 25 feet long, formed of one steel I-beam 8 by 4 inches by 18.4 pounds, placed as shown in



diagram, on which the trolley or traveler will roll on lower flanges of the **I** beam. Height of boom to be 8 feet from deck at mast and 6 feet above bow.

Suitable galvanized sheaves of 6-inch diameter at the bottom of rope groove to be fitted at end of boom and in the swiveling head at the mast end for wire rope traversing tackle. A substantial screw lug or eye to be attached on top side of **I** beam boom at about 4 feet 3 inches from outer boom end for topping lift hoist. A forged screw lug or eye to take the shackle for guys or the boom vangs and to be located 5 feet 6 inches from the crutch yoke. Boom to have suitable forged iron or bronze shoe, securely riveted to end of **I** beam boom at outboard end, for purpose of carrying the trolley sheave, as per drawing.

70. Boom Swivel or mounting will be arranged at mast end essentially as shown, and to consist of a steel plate housing to contain in its lower portion the three sheaves for the operating cables, as well as two rollers to carry weight of boom when the **I**-beam boom is being passed inboard for stowage. This mounting to swivel on a horizontal shaft so that boom can be raised to any vertical angle. This horizontal shaft to be carried in a bronze two-armed casting, that in itself swivels in a horizontal plane and through the center of which pass the three operating cables down to the hoisting winch, this last swivel permitting the boom to traverse in the horizontal plane.

71. Trolley or Traveler on Boom will be designed with a long wheel base and will be made up of steel plates, with suitable wheels, axles and bearings, shackles, and thimbles for wire-rope attachment. The trolley traveler will, in addition, be supplied with two heavy hoisting blocks, with two sheaves in upper block and one sheave in lower block, sheaves being of 9-inch diameter in bottom of groove. Sheaves to be roller-bearing sheaves for a $\frac{1}{2}$ -inch diameter steel hoisting cable, as shown. The lower flanges of trolley traveler will be supplied with two eyes, as shown, for attachment of snatch blocks and chain hook, etc., complete. The boom gooseneck, traveler, and all connecting gear and tackles will be designed and proportioned to handle weights of 9,000 pounds easily. Boom guys or vangs of wire rope to be fitted with pelican hooks for shipping and unshipping easily, all placed to allow the distribution box with cables attached to pass outboard over the stem unobstructed.

72. A Boom Crutch to be provided and installed where shown on plans, boom crutch with palms for connection to deck, and to yoke embracing the boom, to prevent lateral motion; the brace arms conveniently placed, with palms for deck attachment, and all fitted with binding clamps and toggle pins, arranged so that the entire crutch can be readily unshipped when desired. The yoke to be so arranged that the trolley or traveler can pass through it. Brass plates let into deck flush will be fitted under all palms.

73. A Topping Lift Hoist to be also provided, and to have 6-inch galvanized blocks with roller bushings, the block at mast head to be double and the one at the end of the boom to be single, with becket, both being of swivel pattern and suitable for use with $\frac{3}{8}$ -inch steel cable.

74. Shrouds and Chain Plates.

The mast to be stayed by two shrouds on each side, as shown. The shroud tops will be secured in screw eyes fastened into **H**-beam flanges, as shown, at about 2 feet below the connectors for the topping lift and backstay. At the bottom the shrouds to be fitted with turnbuckles and pelican hooks in order that shroud can be quickly released and side gunwales cleared so that cables can be

thrown overboard. The backstay to be secured into the towing post as shown. The backstay not to be provided with pelican hooks.

Heavy galvanized forged chain plates, two on each side, will be through bolted to the frames and bulwarks in a first-class manner, to which the shrouds will be attached. Shrouds to be of $2\frac{1}{4}$ -inch circumference galvanized wire rope or $\frac{3}{4}$ -inch diameter, and will be provided with substantial galvanized turn-buckles for bracing mast. Backstay to be of $2\frac{3}{4}$ -inch circumference or $\frac{7}{8}$ -inch-diameter steel standing cable. Shrouds and backstay to be furnished complete, together with all necessary shackles with screw pins, wire rope sockets for thimbles, eyes, etc. The wire rope to be secured in the sockets by reversing the wires in babbitt as per elevator practice.

All parts will be galvanized after they have been completed ready for assembling.

75. Yardarm.

Of Oregon or Georgia pine, to be placed at the hounds; yard to be 8 feet long and formed 4 inches in diameter at the middle portion, tapering to 2 inches at each end. Yardarm to be secured by band at the middle for attaching it to the upper eye on the after side of the clamps at the hounds. The yard will be provided at each end with lanyard signal pulleys attached to proper bands, and 2 feet from each of the ends an additional set of lanyard pulleys will also be placed. Pulleys fitted to carry $\frac{1}{4}$ -inch-diameter signal halyards.

The mast will be provided with a lignum-vitæ truck 6 inches in diameter, fitted for two signal halyards.

76. Hoisting Winch.

A proper winch, with suitable shafting, bearings, hand cranks, etc., will be securely mounted on deck between cockpit and mast, as shown. In connection with this winch an idler gear will be installed so that the winch can be operated by the engine, if desired, by the throwing in of a coupling and thus obtaining power to drive the winch from the main engine. Ratchet and pawl to be fitted in connection with this winch for holding any drum in any desired position.

There will be two gypsy leads for this power winch, one for handling the anchor and the other for handling other lines. These gypsies will have a minimum diameter of 12 inches and will be driven off the main engine by means of a countershaft of machinery steel, cast-iron clutch with cut gears, and other bevel gears of composition, as approved, geared for a speed of from 40 to 50 feet per minute, all proportioned for handling weights of 9,000 pounds. Shafting to have all necessary bearings and supports and to be so arranged as to take up all lost motion. The operating lever to be located, as directed, in front of or near the mast. A stuffing box to be provided where the shaft passes through the deck and engine-room bulkhead.

All ironwork in connection with the winches and cranks will be galvanized. All shafts on winch will be of cold-rolled steel, running in bronze bushings secured in frame. Cranks will have pipe sleeve, roller handles. The shafts will be squared on the ends and extend through crank handles sufficiently to permit of insertion of split key or pin when cranks are in position.

Trolley traversing cables will be led to and fastened to winding drum or drums in such manner that cables will be always in place and taut. These winding drums capable of winding or unwinding, i. e., reversing, without release of the load, or permitting the trolley to "overhaul" the winding gear. The driving of this traversing drum to be accomplished by clutching into the driving

shaft which receives power from the engine or by throwing onto the clutch shaft a small electric motor. Details of the proposed arrangement for winch can be furnished on request to the Quartermaster General.

77. Anchors.

There will be furnished by the Government one anchor of 300 pounds weight and one of 150 pounds weight, both galvanized, "Eels," or equal, patent stockless type, and there will be provided by the contractor proper racks for their stowage.

78. Anchor Davit.

Provide one portable davit, fitted with all necessary gear, blocks, rope falls, swivel hooks, etc., suitable for hoisting anchor on deck when desired. This davit to be installed through guide secured to stem head and to have its lower end stepped in a suitable socket on deck. Suitable sheave and cleat will also be secured to davit for falls, and snatch block will be provided in deck for taking falls to gypsy head if desired.

79. Mooring Warps.

Sixty fathoms of 5-inch mooring rope with 20-foot length of 10/16-inch chain at one end, shackled to anchor, 75 fathoms 5-inch towing hawser, 50 fathoms of 3-inch manila rope, and 100 pounds of 1½-inch manila rope to be provided.

80. Fenders.

Two large netted rope ball fenders and 10 oak fenders fitted with rope lanyard; size of all as directed, and suitable for their respective purposes.

81. Fire Apparatus.

Provide two sections of first-class approved fire hose, 1 inch in diameter and 50-foot lengths, with all couplings, nozzles, spanners, etc., complete. Racks of ash provided and set where directed, convenient to hand, fire, and bilge pumps.

Three fire axes, hung in suitable brass racks, one in each cabin and one in engine room.

Four fire buckets of galvanized iron, lettered and set in galvanized-iron frame on upper deck, as required.

Two Pyrene, or equal, fire extinguishers, to be installed in engine room and one in pilot house.

82. Lettering—Vessel Name.

There shall be placed the vessel name or numeral as follows: On each side of the bow on the gunwale piece, and on the stern likewise, the wording "U. S. Army—L 63" (or whatever other numeral may be assigned). These to be made in block letters 6 inches high. The letters and numerals to be made either in cast white metal $\frac{1}{8}$ inch thick or sawed-out brass letters from $\frac{1}{8}$ -inch-thick plate. Each letter or numeral to have at least three countersunk holes and will be attached to woodwork by 1-inch brass screw-driver head screws. The lettering on sides of pilot house will be painted as shown.

83. Air Ports.

There will be eleven 12-inch circular air ports installed, five on each side of cabin trunk, where shown, with flange on inside and finishing ring on outside of sheathing. Glass of clear quality set in heavy composition frames. All ports to have two clamping screws and not to be hinge bound but will make up water-tight on gum gaskets. Ports to be neatly boxed around.

84. Life Preservers, Racks, and Life Raft.

Racks of ash battens in forward and after cabins will be provided for the stowage of 12 life preservers, as directed, there being stowed therein 12 approved "A. B. C." balsa wood, or equal, life preservers, furnished by the contractor. One "A. B. C." balsa wood life raft, or equal, elliptical in form, and suitable for use of 12 persons, to be supplied and mounted on top of cabin where directed, properly secured for quick release when needed.

85. Hand, Bilge, and Fire Pump.

To be of composition, double-acting, about $4\frac{1}{2}$ inches in diameter by 6-inch stroke, of approved pattern, Gould Manufacturing Co., or equal, compact design as possible. This pump will be portable and have brass connection plates on upper deck, with brass suction pipe to a bilge manifold and suction pipe to take water from outboard with stop cock or sea valve at side. A composition three-way cock, located above the water line and operated from engine room, to be fitted at junction of the two suction pipes for changing the suction pump. Overboard discharge for fire-hose connection.

86. Towing Bitt.

One white-oak bitt, 9 by 9 inches, with corners well rounded at the top, suitable for towing and warping purposes, will be installed aft, as shown, fitted with oak brace knees and heavy galvanized-iron pin. Bitt to pass through the deck and be securely stepped in hull framing. Top to be covered with galvanized cast-iron cap as weather protection and as a bollard head for lines.

87. Pad Eyes.

Two pad eyes will be installed in flush plate on fore deck ahead of the cockpit, and to be made in accordance with the department's plans, with screw eyes removable so as to leave flush plates. Plates to be properly secured to deck beams below so as not to pull or strain the decking.

88. Cable Compressor.

On deck, forward, between forecabin scuttle and cockpit, will be located a small turntable cable compressor, arranged with movable jaws for the purpose of getting a quick grip on cables or lines. A special type diagram of the construction of this compressor will be furnished from the office of the Quartermaster General on request. Material to be of bronze and cast iron, as shown therein.

89. Mooring Bitts.

On each side, opposite the mast and attached to deck and gunwale, will be installed a casting having two mooring bitts, the heads of these bitts not to project in any case above the gunwale rail. The castings must be smooth and free from fins and projections.

90. Deck Scuttles and Hatch.

There will be installed 6 scuttles as shown—2 in the after compartment, 2 in the fuel compartment, and 2 in the wings of the engine compartment. These scuttles to be 18-inch clear inside diameter, and turned and finished so that all lids and gratings will be interchangeable. Each scuttle hole to be provided with a slide lid and with a grating, design being arranged so that the grate can be lowered in the opening when the slide lid is put into place. The slide lid to be provided with proper lifting rings and an inserted rubber gasket to insure water-tightness when closed. The covers, grates, and frames, with lifting rings and accessories, all to be galvanized. Three extra stowing lugs to be

furnished for each cover, so that the slide covers, when not in use, can be attached to the cabin trunk. A drawing of details of these scuttles will be furnished on request.

In the forward compartment or storeroom there will be a 24 by 24 inch square metal hatch, arranged to be water-tight when closed and to be furnished with a grating when left open. The forward edge of the hatch to swing on a hinge.

91. Bow Sheets.

Bow sheets of steel, to be placed on each side of the bow as protectors against chafing of cables, buoys, and anchors. These sheets to be $\frac{3}{8}$ -inch rolled plate and carefully formed to shape, either hot or by cold hammering. The lower edge of steel shall be located within 1 inch of the upper edge of the copper sheathing of the hull and should not touch the copper at any point. The bow sheet to be secured in place by $1\frac{1}{2}$ by $\frac{1}{4}$ inch countersunk round-head galvanized spikes, spaced about 4-inch centers. Before placing the bow sheets in place the portion of the hull underneath the plates to be covered with a coat of white lead, and canvas laid in thick white lead, the plates then to be spiked into place.

92. Hawse Holes.

At the swivel top in the line of the gunwales, port and starboard, there will be located cast-iron hawse-hole openings with two eyes each, and so arranged that the upper portion of the castings shall carry a swivel gunwale piece which can be swung out at right angles to the line of the gunwale rail, and when so swung out will permit the dropping of cables into either of the hawse openings, after which the swivel piece can be swung into line of rail and thus give a continuous, smooth, flush top to the rail, as it is considered that there shall be no obstructions on the rail to interfere with the handling of electric submarine cables. This swivel piece, when turned into the line of the rail, should be fitted with a lock to securely hold it from accidental displacement. The swivel piece and pin on which it operates to be galvanized. Details to accomplish this can be supplied in the special drawing. (See also par. 55.)

93. Holding Rings.

There will be installed on each side five holding rings, let into the deck with their holding plates flush with the deck planks, and the rings to be essentially flush with the plates, as shown in position on the deck plan. These rings to be 4-inch inside diameter, of 1-inch round iron, forged solid. Rings and plates to be galvanized. In addition, there will be placed on the inside of the bulwarks on each side nine galvanized rings, with eyes attached to plates, essentially as shown; rings of same size as previously mentioned, and plates and rings galvanized. Rings are not to be flush with plates, but to hang loosely on the outside. Plates to be secured to bulwarks by four bolts, as shown.

94. Flying Bridge.

There shall be installed above the pilot house a flying bridge for the use of the mine field officer. This bridge to be provided with galvanized handrail and wrought-iron galvanized stanchions 3 feet high, essentially as shown. On this bridge there shall be installed an engine-room telegraph, as elsewhere specified, and speaking-tube connection to the pilot below. The forward edge of the bridge shall be notched in as shown for purpose of housing the inboard end of the boom when it is drawn in for stowage.

95. Lifeboat and Davits.

There shall be a metallic lifeboat furnished, 12 feet in length, having a carrying capacity of six persons, to be built of galvanized metal, with air tanks and necessary fittings and supplies, to comply with the rules of the United States Steamboat Inspection Service. Boat to be swung at two swinging davits, placed about 14 feet apart on the port side aft, as shown, davits to be supplied with proper falls and lines. Folding cradles for the lifeboat will be placed on the deck of the cabin.

96. Cable Rollers.

A bronze cable roller will be formed in the forward gunwale rail opposite the mast crutch, these cable rollers to be turned perfectly round and to move freely, while at the same time offering no obstruction to cables passing along the gunwale rail.

97. Grab Rails.

Grab rails will be installed on each side of the after cabin gangway, and on one side of the port and starboard gangways to the engine room, and on one side of each pilot-house door, and on top edge of cabin trunk, as per paragraph 58, and on both sides and front of pilot house, as shown; to be of $\frac{3}{4}$ -inch galvanized iron, strongly secured to siding.

98. Sundries.

There shall be furnished and properly fitted one flag staff, aft; to be of spruce, finished bright, with lignum vitæ trucks and brass halyard sheaves, galvanized belaying cleats, and substantial galvanized sockets securely fastened. Suitable woven cotton halyards. One 6-inch eight-day striking nickel-plated ship's clock, Chelsea or equal, to be installed in the pilot house. Two brass boat hooks of heavy pattern with ash poles, one 8 feet and one 10 feet long. Two cork life buoys, lettered and secured in position. An approved ship's bell of bronze, about 12 pounds weight, mounted on brass hangers where directed. Two name boards, appropriately molded or carved, painted and gilded.

CHAPTER 3

GENERAL MACHINERY PLANT—DIESEL DIRECT CONNECTED TO PROPELLER SHAFT

100. General Description of Main Propelling Engine.

(a) The vessel to be propelled by a direct-acting, two or four cycle, solid or air injection, marine Diesel engine of 4 or 6 cylinders designed to afford about 120 shaft horsepower at normal propeller revolutions and shall deliver the required horsepower on standard commercial grade fuel oil, as hereinafter specified. The cylinders shall be of such size as to permit of the development of the required horsepower at normal piston speed in feet per minute and with a mean effective pressure within practicable ranges.

(b) The engine shall be constructed to operate on the full Diesel cycle and of a marine type standardized by use, and constructed as light as consistent with ample strength, and in its design the thrust bearings at one end shall be arranged as part of the engine foundation or rigidly attached thereto.

(c) The engine shall be fitted with the necessary multistage air compressor driven directly from the main crank shaft, circulating pump of centrifugal or rotary type for cylinder-cooling water, fuel-oil service pump, and lubricating-oil pump together with duplex or triplex oil filters, steel air bottles of sufficient capacity to afford 20 starts, air storage tank for whistle service, service tanks, exhaust silencer, and shall be fitted complete and throughout with oil, water, air, and exhaust piping system, drip pipes, valves, and fittings, reduction gear for indicator and indicator connections, lubricators, pressure gauges, thermometers, necessary oil cans, wrenches and wrench board, and all piping systems complete, together with all other necessary parts and apparatus required to make the installation complete and ready for operation in every detail.

(d) The engine must be capable of direct mechanical control from the pilot house, without interdependence of the engineer of the watch. The mechanical control to be positively provided for by cable, electric, hydraulic, or pneumatic (compressed air) means, as the design of the engine contractors call for, and yet capable on instant reversion to operation "on signals," should the pilot at any time consider necessary.

(e) The engine and its auxiliary parts, equipment, and attachments must be of a standardized design, capable of giving sufficient power for properly propelling the vessel with the vessel floating at the designed load water line, and if the size of the engine given herewith is not deemed sufficient by any bidder to enable him to meet requirements as specified, then it is understood that the same may be increased as necessary; but such a fact must be so stated in the bid.

101. Requirements of the Engine Contractor.

The engine contractor will be required to guarantee the engine to deliver not less than 120 brake horsepower on shop test when using a good commercial grade of fuel oil containing not more than 19,000 British thermal units per pound and the specific gravity not lighter than 16° B. at 15° C. Bidders are requested to state what variation is to be made in their guaranty for slight

difference in quality of oil from that herein specified. The engine builder will be required to furnish the fuel and lubricating oil required for making the necessary efficiency and capacity tests at the factory of the manufacturer. The engine will be tested at the factory of the manufacturer to determine whether same complies with all requirements of the specifications and guaranties submitted. (See also paragraph on "Shop test.")

Each bidder will be required to furnish the following information in connection with the engines proposed:

- Diameter of cylinders.
- Length of stroke.
- Revolutions per minute.
- Diameter of piston rods.
- Brake horsepower guaranteed. (Not less than 120.)
- Diameter of exhaust pipes.
- Diameter, face, and weight of flywheel.
- Diameter and length of crank pin.
- Dimensions of main bearings.
- Weight of heaviest piece.
- Indicated horsepower required to overcome friction.
- Area of crosshead shoe.
- Diameter of main shaft.
- Estimated weight of sub-base.
- Estimated weight of engine complete.
- Dimensions and details of crosshead and of crosshead pin.

In addition, each bidder will be required to furnish a complete specification of the engine proposed, giving description of all important parts of construction and furnish cuts or photographs descriptive of the principal parts of the completed engine for information in the guidance of award of contract.

102. Foundation and Engine Bed.

The engine foundation is to be constructed by the shipbuilder in as long timbers as practicable in accordance with the type of hull selected under the proposed contract. A proper template shall be furnished by the engine contractor of the exact size in drilling of engine frame which shall be used in locating foundation bolts in order that there may be no deviation from the exact engine position when placed in the hull of the vessel. The engine frame or foundation shall preferably be made in one casting with self-contained oil pan and fitted with large manhole covers securely bolted on the sides of foundation opposite each crank. These covers shall be of ample size for convenience and examination of all bearings. The entire engine bed shall be made oil-tight to prevent the escape of any lubricating oil through any parts where openings are provided for adjustment or where shafts or pipes extend through same.

103. Main Thrust Bearings.

Of the ball-bearing, double-row, deep-groove type or of the Kingsbury or equal type, and either type shall be installed as an integral part of the engine foundation at one end only. All to be of substantial build and fitted for adjustment. Oil boxes of large capacity. All necessary means for lubrication by the engine lubricating system. Whatever the type of thrust bearing decided upon there shall be arranged proper provision for stuffing boxes or rings to prevent escape of oil around the shafts at ends of bearings. Oil troughs, drains, and shields of galvanized iron with hinged lids, all as required.

104. Reversing System Used by Propelling Plant.

The engine to be furnished to be a direct reversing marine type of Diesel, with reversing preferably accomplished by the sliding cam-shaft method.

It is important that the reversing gear to be adopted should be capable of quick reverse by mechanical means under positive control of the pilot, as set forth in the general requirements of this engine in opening description.

105. Main Bearings.

The main bearings shall be provided with removable boxes lined with best Babbitt metal hammered in, then bolted and scraped to accurately fit the shaft. The boxes shall be securely locked in position and so constructed that they may be rolled out for examination and may be readily and accurately adjusted, and provided with best possible means of lubrication throughout.

106. Crank Shaft.

The crank shaft shall be made of hammered open-hearth steel, forged in not more than two pieces, ground true and smooth to accurate running surface. If crank shaft is made in two pieces, the ends shall be constructed with a flange as integral part of the shaft and be supported by main bearings on each side of the flange connection. The shaft shall be of ample size to prevent springing, and important consideration will be given to the size and type of shaft proposed by the engine builder. The shaft stock or material will require the approval of the American Bureau of Shipping, and must be free from all imperfections and flaws, the workmanship and material being of the very best throughout.

107. Tail Shafts.

Of forged high-grade tobin or phosphor bronze 3 inches in diameter, with bronze casings $\frac{1}{8}$ inch thick, properly secured in position on shaft, at stuffing box, and stern bearing to receive wear at bearings and to protect shaft, finished all over. Outer end of shaft tapered $\frac{3}{4}$ inch per foot, cut with keyway for propeller, also fitted with holding-on nut, locked in place. Templates furnished for ends of shaft. Coupling of such type that shaft can be removed through stern gland.

108. Stern Tube.

A heavy lead or copper pipe tube will be installed through shaft log, made up water-tight at stuffing box and stern bearing, allowing ample clearance around the shaft. Outboard ends of tubes will be suitably flanged to stern-frame casting.

109. Stern Bearing.

Will be of composition, with flanges to conform to sides of sternpost and be securely fastened through same. It will be fitted with removable bushing and fitted with bearings of the "Goodrich" "cutless" type or equal in which the usual lignum-vitae is displaced by rubber. Proper provision to be made for water circulation through these bearings. Ahead of the inboard stern bearing and aft of the stuffing box there will be installed a lantern ring providing for a water inlet pipe of at least 1 inch diameter for the supply of water from the cooling water discharge of the main engines, for purpose of lubrication of the "cutless" bearing. Stern bushings must be so made as to be easily withdrawn, repaired, and replaced when desired. Bolt holes to be so drilled that bushings may be turned into various positions if desired. Both inner and outer bearings will be of the split type to permit of easy removal and transfer of top half to lower half.

110. Stuffing Box.

Will be made of composition and secured in place at inboard end of shaft log by means of flanges at least 4 inches wide and $\frac{5}{8}$ inch thick, extending alongside of shaft log and bolted through same. Follower or gland as well as bolts and nuts to be of bronze. Stuffing box to have packing space about 3 inches by $\frac{1}{2}$ inch and same to be filled with best hemp packing.

111. Spring Bearings.

Aft of thrust bearings and as may be required. This spring bearing to be supported on pedestals of steel plate and angles as supplied by the hull contractor, will be made in cast iron, bolted down with forged steel bolts in reamed holes. They will have the lower parts lined with white metal, the ends provided with oil drips. The white metal to be fitted into dovetail recesses. The cast-iron caps will be recessed away from the shaft and will have oil boxes cast on them, with hinged covers and wick-feed lubrication.

112. Lubrication.

All principal bearings of main engines shall be lubricated by forced-feed lubricating system, and lubricating oil shall be filtered from oil chamber before being reused in oiling system. Lubricating system shall be automatic and positive in its action. The entire system to be so arranged that all parts shall receive ample and sufficient lubrication at all times. The pipes or feeders to be fitted with sight feeds, suitable stopcocks, etc. Such oil cups and grease boxes as required will be installed on thrust bearings, shaft bearings, etc.

A diagram of the entire forced-feed lubricating system shall be prepared and placed under glass frame for ready use of engine room attendants.

Any stoppage in the forced lubricant flow when engine is in motion to be instantly indicated by an electric or other alarm.

113. Flywheel.

A flywheel of sufficiently large size and weight, carefully turned all over and balanced, will be provided on engine to insure smooth running. This flywheel to be arranged with grooves or cogs for purpose of "jacking" or "barring" over the engine when cold. Flywheel to be accurately marked for all points in cycle of operation of all cylinders, with a pointer on the engine base to carefully set these points.

A flywheel casing should cover the exposed portion of wheel with proper removable covers to be taken off when engine is to be jacked over.

114. Jacking Gear.

An approved hand-jacking gear will be fitted for turning the main shaft, by the use of a worm or similar device, and this is to be so arranged as to be readily thrown into or out of gear and locked in either position. A rack will be provided for stowing the ratchet wrench used in this gear. Pinch bars for main engine will be stowed in proper racks in the engine room.

115. Connecting Rods.

Connecting rods shall be constructed of drop forged chrome molybdenum or equal electric furnace steel forged in one piece of "I" cross section. Cross-head pieces and crank ends shall be fitted with bronze-lined bearings, scraped true to gauge. Forced-feed lubrication to be provided through wrist pins, connecting rods, and crank pins.

116. Cylinders.

Cylinders shall consist of castings composed of a water jacket and a separate cylinder liner and must be of close-grained charcoal iron of uniform character

having good strength qualities and free from air holes and other imperfections. These cylinder liner castings are desired as separate units of exact workmanship, and shall be of close-grained hard charcoal iron mixture, and shall be forced into the water jackets and held securely at the top. Cylinder walls to be of sufficient thickness to allow for re boring, and shall be accurately machined and ground, and properly chamfered top and bottom. Cylinders shall be accurately bored and finished to micrometer measurements. All cylinders shall be carefully cored for water jackets, which will cool all parts of the cylinder equally and all openings of water jackets shall drain to a low point fitted with drain pipe and valve.

117. Pistons.

The pistons shall be hollow and shall be constructed as light as consistent with proper strength of aluminum alloy, such as "Bunight" or equal grade and provided with accurately ground and fitted spring packing rings, ground true and smooth before being placed on the pistons. Rings shall be cut and then turned and ground to exact cylinder size, as per the rings of Double Seal Ring Co., of New York, or equal, it being required that the pistons and rings be tested in place and afford positive evidence that the rings operate tight when under pressure.

118. Valves and Valve Gear.

The valves shall be ground true and smooth, securing positive tight seating over admission and exhaust ports. The valves shall be so constructed that they may be readily removed for repair or renewed by new valves. Admission and exhaust valves shall be actuated by eccentrics or cams cut from solid metal. The valves and valve stems shall be cut from one of the new high-grade metals which are immune to high heat and yet possess large tensile strength. Certificate that such metal has been used must be furnished. The cam shaft and its fittings shall be as nearly housed as it is practicable to do so. The entire valve gear shall run true and positive and free from vibration and all wearing surfaces shall be of hardened steel ground smooth and polished. The valve gear shall be provided with ample adjustments for wear and shall be so constructed that the adjustments of valves may be easily and readily effected. The valve rods shall be fitted with removable sleeves or guides which may be readily replaced. The valve gear shall be so constructed as to permit of the reversing of the engine in the minimum time from full speed ahead to full speed astern. No engine will be considered which does not give full normal rated ahead speed of propellers on astern rotation and the engine will be required to run on trial at full rated horsepower and speed astern for a period of 30 minutes without heating or other apparent injury.

119. Engine Control from Pilot House.

Whatever type of Diesel propulsion plant is adopted, the control of this engine must be provided for by direct mechanical means from the pilot house, as set forth in paragraph 100 (d), and the reversing gear on the main engine must be so designed that it can be coupled in with the control apparatus from the pilot house, whether the connections of the same are by direct mechanism, cable, electric, pneumatic, or hydraulic. The construction and design shall be such as will permit of ready manipulation of the engine by the pilot in response to his requirements to go ahead, to stop, or to back, and the control of the speed of engines in forward and backing position must be entirely in his hands. These results to be accomplished by quick acting mechanism and this mechanism shall operate with as little manual and mental effort as possible or as may be consistent with the operations involved.

The pilot house control mechanism to be of the Cory, Fairbanks-Morse Co., or equal manufacture, embraced in a substantial pedestal, and with amply long levers so arranged that the lever will be pushed forward for ahead movement of the ship, and pulled aft for astern motion, and with the lever vertical for stop. The speed control to be taken care of by the extent to which the lever is pulled forward or aft, or by supplementary lever directly controlling the speed. The contractor must demonstrate during the trial trip that with the boat proceeding full speed in either direction the engine can be reversed from this position into the corresponding speed in the other direction in not more than 15 seconds. The construction of the reversing mechanism shall be such as to readily accomplish this object, and the manufacture of the starting valves, the fuel control and reversing mechanisms shall be sufficiently strong to withstand the wear and tear of extremely hard service.

120. Atomizers—Mechanical or Air Injection.

There will be afforded due consideration either to direct mechanical-spray injection or compressed-air spray injection, as a means of breaking up the fuel oil into the fine particles required for proper Diesel atomization. The design of these spray tips and their location at cylinder ends and the construction of the atomizer cages should be early submitted with the full detail of the proposed design. The means for quickly removing cages and tips, and the demounting of connecting piping should be clearly shown.

121. Governor.

The governor to be of the centrifugal type, acting directly on the fuel-oil pumps by varying the amount of oil required for different loads, or by the use of such other means as will insure a regularity in the oil supply and hence constancy of speed, together with an overspeed device which shall prevent any tendency of the engine to race.

122. Water Pump on Engine.

Of ample capacity to circulate the cooling water to the cylinder jackets and to cool the engine properly under all conditions. Pump to be of the reversible gear type, with bronze rotors and stainless steel shaft. A pressure switch and bell alarm shall be furnished for connection in the circulating water system. This switch shall act when the pressure on the circulating water system falls too low and cause the alarm to ring until the pressure is restored or alarm cut off.

123. Lubricating-Oil Pump.

To be fitted integral with the engine and to be of sufficient capacity to amply supply the entire system. The pump to be of the reversible, duplex gear type. The pressure side to force oil from supply or filter tank to main lubricating-oil header, the scavenging side to force oil from crank-case sump through cooler to filter tank.

124. Auxiliary Air Compressor.

There will be installed one motor-driven multi-stage auxiliary air compressor as specified under this heading in the electrical equipment following.

125. Air Bottles.

The engine will be supplied with compressed-air bottles with sufficient air capacity for 20 starts. The compressed air will be furnished from the main engine or the auxiliary air compressor. The design and test proposed for these air bottles must meet the approval of the officer in charge and the requirements of the American Bureau of Shipping. The certificate of test, the

statement of its steel, and its other physical requirements must be furnished by the engine contractor for each bottle on the acceptance of the engine plant by the Government or by the hull contractor, these bottles to be seamless drawn steel and to be tested to 3,000 pounds pressure per square inch, and proven satisfactory in every respect, before proper officials authorized to make the test and to furnish certification for the same.

126. Bulkhead Stuffing Boxes.

Should the hull design with its bulkheads require the main shafts to pass through water-tight bulkheads there shall then be provided where such shafts go through these bulkheads, stuffing boxes of cast iron with composition lining, with split glands. These stuffing boxes will be secured to loose plates bolted in place and of a design to be approved.

127. Water-Cooling System.

The engine to be properly water cooled at all portions requiring it. Cooling water will enter the engine from 1½-inch copper pipes at the cooling-water lines and will leave at the manifolds on the exhaust headers. It will then pass by external connections to the water jackets on the exhaust pipes and then discharge overboard. There will be by-passes around the overboard discharge to the pump suction for recirculating the heated water through the engine. There will also be a by-pass for circulating water to the stern tube cutless bearing. For use in winter season when the water intake encounters "string ice," a warming-up jacket to be arranged near the intake by a by-pass taking the hot water from the exhaust side of the cooling-water circuit.

The engine water-cooling system will be fitted with high-grade brass-case thermometers with well and extension stem to indicate the temperature of the sea water before entering engine.

128. Starter.

The engine to be provided with an approved mechanically operated air starter, to operate on all cylinders, and to properly cut out as soon as the main cylinders start in firing.

129. Engine Mufflers.

To be fitted in or at base of stack, and to be of Maxim or equal design avoiding back pressure, and of a type to be approved, and to be coupled up with the exhaust side of the cylinder water-cooling system. The exhaust leads from the engine to the muffler to be as direct as possible and free from any short bends to reduce back pressure to minimum. Air-cell covering of the Johns-Manville Superex, or equal, to be installed on exhaust pipe where it leaves the engine until it joins the muffler.

130. Finish.

All castings in main engine, manifolds, and exhaust piping shall be free from spongy spots and blowholes, and all rough surfaces shall be filled, rubbed down, and finished to a smooth and even surface. The engine shall be given two coats of best grade of paint before shipment from the factory and after entire engine installation shall be given two coats best grade white enamel.

131. Tools and Furnishings.

There will be furnished a complete set of tools, wrenches, spanners, etc., for every part of the engine equipment. Wrenches to be forged, finished, and casehardened. The following tools will also be supplied:

Three Coes or equal monkey wrenches of 6, 12, and 18 inch lengths.
 Three Stillson wrenches of best quality of 6, 12, and 18 inch lengths.
 One machinist's hammer.
 One copper hammer.
 Three screw drivers of 6, 12, and 18 inch lengths.
 Six chisels, assorted sizes.
 Two pairs pliers; one round nose and one side cutting.
 One set of brass oilers, consisting of 3 pieces, all mounted in brass oil tray, as approved.
 One wrench board for the mounting of above tools nears the engineer's station.
 Three oil tanks, galvanized steel, of 20 gallons capacity each, fitted with lock cocks and provided with suitable arrangements for filling; to be rigidly secured in engine room as approved. Tanks to be fitted with drip pans under faucets.

132. Lifting Gear.

Arranged over engine, there will be a beam and traveler (supplied by the hull contractor), to which will be attached or suspended a proper chain fall, provided by the engine contractor, all as approved, and capable of lifting 500 pounds. Blocks to be Yale & Towne triplex, or equal.

133. Spare Parts for Engine.

Spare parts for the main engine plant will be supplied by the engine contractor, as follows:

One exhaust valve complete, with cage, spring, etc.
 One intake air valve complete, with cage, spring, etc.
 One fuel valve complete, with cage, spring, etc.
 Ten per cent of fuel valve needles, or the equivalent.
 One starting air valve complete, with cage, spring, etc.
 One cylinder relief valve complete, with cage, spring, etc.
 One full set of piston rings for two pistons.
 One fuel pump complete, for the working parts of one cylinder.
 One piston-lubricating pump complete, for the working parts of one cylinder.
 One air-compressor piston-ring set for each size piston.
 Ten per cent of the valves for all air compressors of at least one of each size and type, complete, with cages and seats.
 Two connecting-rod bolts and nuts, top end.
 Two connecting-rod bolts and nuts, bottom end.
 Two main-bearing bolts and nuts.
 One-fourth set of coupling bolts for one coupling of each size.
 One spring of each size and type, fitted.
 Twenty-five per cent of special gaskets and packing, or at least one of each kind.
 Five per cent of cylinder-head studs of engine and compressor.
 Two sets of crank boxes.
 Two sets of cross-head brasses or bushings.
 One set of main-bearing boxes.
 Set of gauges and templates for adjusting gear and aligning main bearings.
 Book of instructions for operating, maintaining, and overhauling the main engines.
 Set of blue prints of diagrammatic arrangement of cylinders and connecting parts.

134. Clutch on Main Shaft.

There shall be installed on the main shaft, aft of the engine, a properly designed friction clutch capable of positively carrying the whole engine load without undue heating, the intention being that the engine can run idle, without moving the propeller, following which a forward jack-shaft clutch can be thrown in for purpose of driving or furnishing power to the deck winch.

135. Clutch on Forward Shaft.

The forward end of the engine to be so arranged that a positive clutch can be thrown in on the forward end of the main engine shaft. This positive clutch to drive a smaller "jack shaft," which provides power for the winch on the forward deck. Conveniently located below the pilot house there shall be located on this jack shaft a friction clutch that can be thrown in or out at the will of the winch operator, in accordance with the needs for power at the winch.

136. Propeller.

Of cast phosphor or manganese bronze, solid, three bladed, and of suitable diameter and pitch as will absorb the horsepower developed at the intended speed of engine and vessel. The wheel to be designed for best possible speed, in ahead motion. Hub counterbored to go over composition sleeve on shaft about $\frac{3}{8}$ inch and be fitted perfectly water-tight with red lead putty; also accurately bored to fit taper on end of shafts and fitted with longitudinal key; holding-on nut with washer screwed on and locked in place. Conical cap fitted water-tight over nut on end of shaft flush with hub. Propeller to be carefully balanced by being swung on a mandrel and excess of metal on heavier blades removed. Blades to have equal pitch and be equally spaced. Edges of blades must be sharp, fair and smooth, and all imperfections must be removed. Approved template of bore of hubs and keyways to be furnished. Propeller to fit close up to end of stern bushing to prevent lines from jamming in forward end of hub. Design for the propeller to be submitted and approved before proceeding with the work of manufacturing the same.

137. Shop Test of Engine.

The engine shall be set up at the factory of the manufacturer for operation under normal full-load conditions. The contractor will be required to furnish a suitable brake for applying the necessary constant load to demonstrate that the engine will develop the normal rated capacity at the normal rated speed and with the grade of fuel called for in the specifications. Each engine will be run continuously under full-load conditions for a period of four hours and indicator cards taken as nearly simultaneously as possible on all cylinders every half hour. During this test readings will be taken of the temperature of the important parts, as may be directed, including water inlet and outlet, and measurements taken to determine the fuel consumption. In addition to the normal full-load test run, the contractor will be required to load the engine to its maximum capacity to determine what load it can carry on same without undue reduction in speed. All parts of the engine shall be of sufficient strength to permit of the engine carrying full fuel injection; and minimum speed shall be capable of reduction to 30 per cent of maximum speed without stalling of the engine. The engine shall be properly balanced so as to run at its maximum speed under reduced load without undue vibration.

Notification of readiness for this shop test should be extended by the engine contractor at least 10 days ahead of the date set, in order that the War Department may have a representative present to witness the test and check the data.

138. Replacement of Defective Engine Parts.

The engine contractor shall execute guaranties to the effect that he will replace all parts found defective through imperfect material, faulty construction, or improper workmanship, for a period of at least one year after acceptance of the engine by the Government, and all such parts to be replaced without cost.

139. Bilge Pump.

A composition single-acting plunger pump, of about $3\frac{1}{2}$ -inch diameter and 3-inch stroke, or other approved size and type, will be provided and attached to the main engine frame, the pump to be so arranged that it can be used as a circulating pump for the main engine. The pump to operate at about one-half the speed of the engine. The connecting rod driving-pump plunger to be bushed with bronze-fitting steel crank pin of large diameter on driving disk. Pump to have necessary bronze check valves on suction and discharge sides. Brass $\frac{1}{4}$ -inch suction connections with necessary controlling valves will be provided from sea and also at lowest point of bilge in two main compartments: one under forward cabin and one under engine-room floor. Suction pipes to be made up water-tight in passage through bulkheads and to be fitted at bottom with brass detachable strainers, protected by heavy sheet-lead strainer boxes or wells. Valves for controlling separate suctions will be placed in accessible positions; those in pipes from engine room and forward compartment to be placed under floor of engine room. Discharges from pump will be run overboard through hull, above water line, with shut-off valve, also to valve on deck, arranged for 1-inch hose connection, valve to be finished composition. All openings for pipe connections through hull will be lead lined and made perfectly water-tight, the hull planking being reinforced at such openings with oak blocks, securely fastened.

140. Fuel Tanks for Diesel Oil.

There will be two galvanized-iron tanks 7 feet long by $2\frac{1}{2}$ feet in diameter, made of $\frac{3}{8}$ -inch steel plate, each having a capacity of 260 gallons, fitted in fuel compartment forward of engine room, one tank on each side, solidly secured in iron pans under tanks, and with drains as specified in item No. 48. Pans shall have no perforations, except the one required for the drainage tube. Suitable vent or breather pipes of $\frac{1}{2}$ -inch galvanized iron will be provided from the top of each tank. These vents to run upward inside of compartment vents and have proper return bends at upper ends to prevent any possibility of water getting into tanks through vents. The filling pipes for tanks will be of galvanized iron, installed through side of cabin, one filling pipe on each side, thoroughly oil-tight. The fitting will be of cast composition. It will be tapped with $1\frac{1}{2}$ -inch standard pipe thread and fitted with water-tight screw cover plate. On the outside of this cover will be a cast lug to facilitate easy turning by hand, also means for attaching lanyard to prevent loss of cover while handling. Two spare covers, to be furnished and fitted ready for use; also, two spanner wrenches provided for turning cover. Two 10-inch galvanized sheet-iron funnels of strong construction will be provided, each fitted with brass gauze strainer of fine mesh and ample air vent tubes. Funnels to have their lower ends made up into $1\frac{1}{2}$ -inch standard galvanized-iron nipples, with special flanged union fittings of approved design, to make up oil-tight against flanged fittings on cabin. Provide 20 feet of 1-inch rubber-lined filling hose. Connected with each fuel tank will be installed a fuel-oil-height indicator, to be located on the forward engine-room bulkhead, so that the engine-room attendant can at all times know the amount of oil in each tank, this indicator consisting of a gauge operated on the pressure or pneumatic principle, and con-

nections to be made back to fuel tanks with as small diameter of copper pipe as is practicable, with all soldered connections.

141. Fuel Piping.

An athwartship pipe will be installed from each side tank leading to the engine, and will be so located in reference to the engine that a gravity feed may be maintained at all times. All fuel pipes and valves throughout to be provided and properly placed to make installation complete in an approved manner, valves in general to be fitted inside of fuel tanks with valve stems extended to top of tanks and brought through a proper stuffing box. Valve stems to be operated by rods and gears brought through the steel bulkhead into engine room. Pipes will be of pure copper and will be made up at tanks, valves, etc., with brass unions of special approved design, a heavy washer being brazed on the pipe and solidly clamped into the body of the union. All fuel tubes to be in continuous lengths wherever possible, solidly brazed together; changes in direction to be accomplished by bending the pipes, and any branches required will be brazed connections. Proper drainage or draw-off plugs or connections, with lock cocks, as approved, will be provided from the bottom of each fuel tank, the drain cocks being placed in accessible but protected positions. Bottom of tanks to drain to the above connection.

142. Auxiliary Diesel Fuel Tank.

An auxiliary fuel tank of galvanized iron, about 20 gallons capacity, will be rigidly secured in position on bulkhead at forward end of engine room, with all connections complete to furnish gravity feed of fuel oil to the electric generator. Gauge glass on tank to plainly show quantity of fuel oil in same; also 1/8-inch brass test cock at top and bottom, fitted oil-tight into tank, which will be properly reinforced. A suitable oil-tight fitting to be installed on top of tank for filling purposes, extending from a brass deck plate on main deck. The tank to be fitted with a vent or breather pipe extending not less than 4 feet above top of deck house and to be fitted with a gooseneck bend with a proper wire gauze insert. The tank shall be constructed and tested according to the requirements of the United States Steamboat Inspection Service. A brass plate with the words "Fuel Oil" in 1-inch letters cut therein shall be placed on the tank. All connections from this oil tank shall be made in copper or brass pipe and fittings with tight connections.

143. Lubricating-Oil Tank.

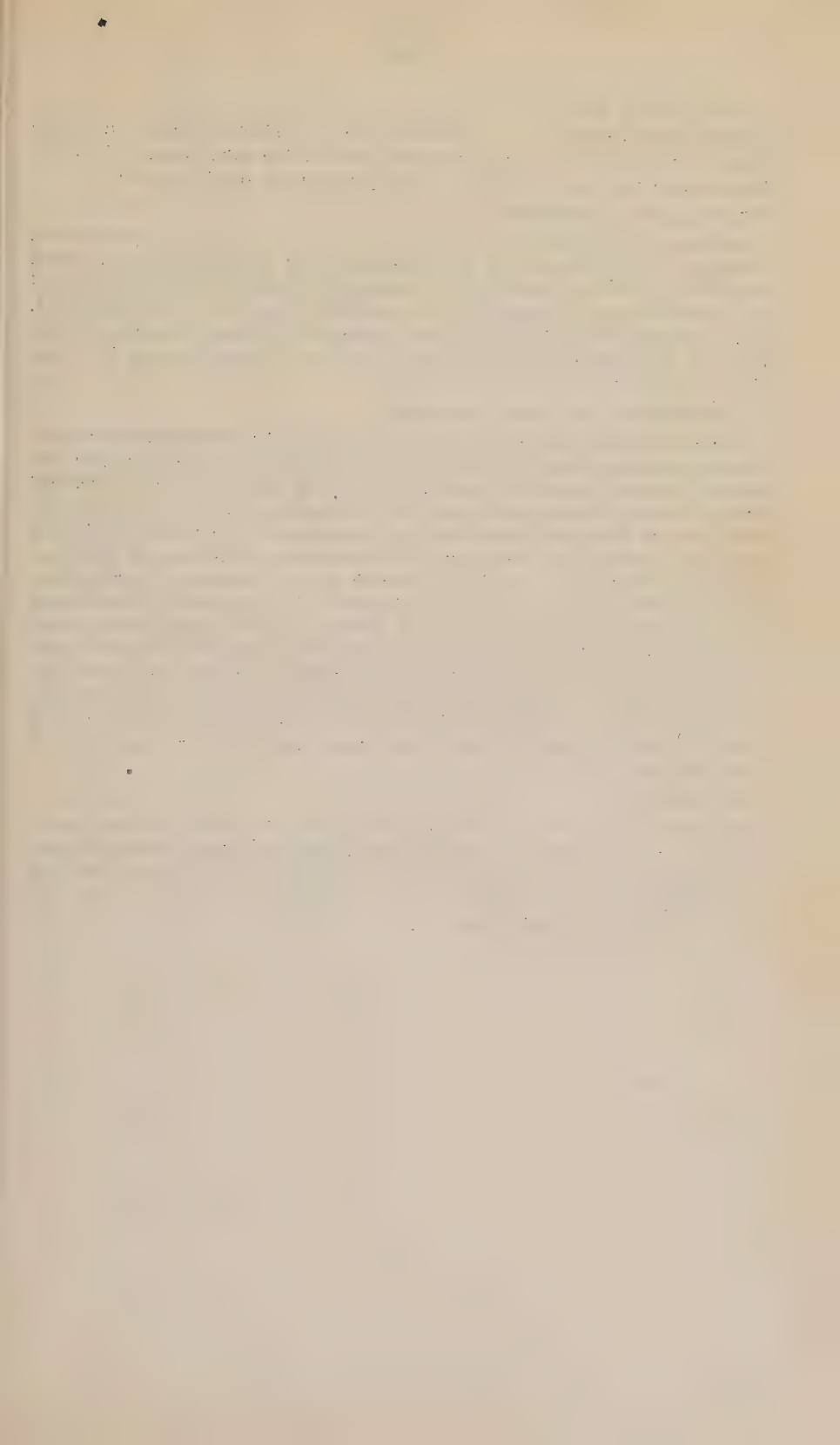
One lubricating-oil tank having a capacity of 25 gallons shall be installed in the engine room where directed, the tank to be piped to a deck connection for purpose of filling, and shall have a suitable vent. The tank to have a bibcock for withdrawing oil and a drain. A brass tray with perforated false bottom under bibcock shall be installed.

144. Whistle Air Tank.

Tank will be of galvanized sheet iron about 9 feet long by 14 inches in diameter, riveted and soldered perfectly air-tight, and of such construction to safely resist a pressure of 225 pounds per square inch. Tank will be fitted with composition spring-loaded safety valve of approved design, set to a pressure of 75 pounds per square inch. Tank and all connections of air system for whistle to be soldered perfectly air-tight and proven so under test for 12 hours.

145. Revolution Counter.

One approved revolution counter will be supplied and fitted up in running order, attached to main engine by means of worm gearing.



146. Mechanical Bells.

There shall be installed a mechanical bell of 6-inch diameter in engine room, operated by a proper bow-handled pull in the pilot house. Also one 3-inch jingle bell, and connected to hook-handle pulls in pilot house.

147. Engine-Room Telegraph.

Engine-room telegraph will be fitted from pilot house to engine room with an extension of the connection so that a corresponding telegraph can be operated from the flying bridge. Such bridge telegraph to be duly installed of a rugged waterproof design. Telegraph to be mechanically operated, nonilluminated, 6-inch diameter dial, of Cory or equal, make. The bridge telegraph capable of being disconnected when not actually in use. Telegraph shall be direct signal and return system.

148. Guards Over and About Machinery.

The contractor should seek to provide all usual and proper safeguards about rotating machinery, such as sheet-metal guard boxes, while high-rotative machinery should be completely housed. No rotating shafts, whether mechanical or electrical, in any open position shall have exposed set screws or lock nuts, but must use the Bristol or equal flush or countersunk bolt or nut. No belting must run exposed. No flywheel must run exposed so that rotating arms can pick up a foreign object as a bolt or wrench or hurl the same. No fans must run exposed without a fine-mesh wire protector of at least $\frac{1}{2}$ -inch mesh as a guard against the rotating blades. No heated pipes or flanges must remain uncovered in the range or passage of attendants properly on duty or watch, all such being insulated by proper asbestos coverings and finally sheathed with a metallic jacket. Pipes and obstructions in flooring of engine room must be avoided, but where unavoidable shall have a proper step over them, with a properly placed handrail at usual hand height, and an electric light over or near the location.

149. Whistle.

There shall be installed on the deck over the pilot house an air-actuated whistle of the Cunningham, Tyfon, or equal, type, and of size suitable to this craft, together with its proper compressed-air piping from the whistle air tank to the whistle, and fitted with its proper whistle-cord pulls from both the pilot house and the flying bridge.

CHAPTER 4

ELECTRIC SPECIFICATIONS AND AUXILIARIES

200. Electric-Light Plant.

Provide and install complete in every respect, in running order, a Diesel engine generator set which shall be able to start easily by hand and to generate current whenever electric lights are in use and to stop automatically whenever any lights are turned off. The generator to be of the direct-current, 110-volt, 4-pole, compound-wound type, to have a capacity of 3 kilowatts. The engine will be of the vertical 2-cylinder, 4-cycle, water-cooled type. The engine will be mounted on a metal bed plate and direct connected through flexible coupling to the 4-pole generator, General Electric or equal. The whole set must operate in a quiet and efficient manner. A 32-volt battery for starting and an automatic switch to be supplied with the generator set.

With the above equipment will be furnished necessary lubricators and automatic controls. The fuel-oil supply for the engine will be obtained from the fuel-oil tank previously mentioned.

201. Storage Batteries.

The contractor will furnish and install, on suitable trays, 32-volt storage battery, having a rated capacity of 200 ampere hours, equipped with clips fitted in hardwood boxes or mounted on racks made of heavy wooden framework. The batteries to be used for lighting purposes and for operating all auxiliary motors in place of the generator and for such they are to be wired for charging and discharging purposes. A Sangamo (mercury-motor type or equal) ampere-hour meter, designed for use in connection with storage batteries, for the purpose of indicating the input and output of the batteries; a voltmeter and ammeter, a rheostat, and necessary switches, cut-offs, etc., are to be installed at the switchboard panel. A proper hydrometer will be furnished for the testing of batteries.

202. Switchboard.

The contractor will furnish and install an ebony wood switchboard, on which will be mounted a pilot lamp with shade, Weston miniature precision ammeter, automatic circuit maker and breaker, and D. P. D. T. engine switch; also resistances for operating the storage batteries in parallel with the generator for the lights, if necessary, together with the usual fittings for a plant of this nature.

The boat will be wired for about 16 incandescent "Mazda," or equal, lamps, including the running lights. The lights for engine room, cabins, and toilets to be wired in neat moldings, with key sockets mounted on neatly turned hardwood blocks. The running lights to be wired with Navy standard weatherproof fittings, 5 lights in all.

The fixtures for cabins, machinery space, and toilets will be brass oxide finish, of approved pattern, and in number as follows:

- One three-light cluster in pilot house.

- Four ceiling lights in engine room.

- One ceiling light in toilet.

- Two ceiling lights in troops' cabin.

All wiring to be for 20-watt, 110-volt Mazda lamps, one lamp being installed in each lamp outlet on completion of the work.

The following spares, etc., to be provided by the contractor:

- 12 spare 20-watt, 110-volt Mazda lamps.
- 2 rolls tape.
- 2 key wall sockets.
- 1 W. P. plug.
- 20 feet electric wire.
- 2 wire guards for hand portable lights.
- 2 $\frac{3}{8}$ -inch key sockets.
- 2 wire guards for hand portable lights.
- 20 feet marine cable.

203. Wiring Plans.

The contractor to furnish a clear set of electric wiring diagrams of all power and light circuits installed, as well as instructions for operating all electric apparatus on board. These diagrams and instructions to be framed under glass, in order that engine-room attendants can readily study the same.

204. Motor for Winch.

There shall be furnished and installed a small electric-driven motor capable of direct attachment to the jack shaft for driving the winch. This motor to be located in the engine compartment and under the observation of the engineer. It shall be geared down so as to be of a capacity to slowly drive the jack shaft when the motor is being used as a substitute for the engine power. This motor to be controlled from a switch at the mast.

205. Auxiliary Bilge and Fire Pump.

An electric motor-driven small size bilge pump to be installed than can be attached to the bilge lines indicated above, or which can be used if occasion demands on the hose-line connections.

206. Auxiliary Air Compressor.

Furnish and install where directed one electric motor-driven multistage air compressor of sufficient capacity to supply the required quantity of air for additional air supply in pumping up the main air bottles. The air compressor shall be fitted with an automatic release or safety valve which will prevent the accumulation of abnormal or dangerous pressure. Compressor cylinders shall be water-cooled. Installation to be complete with all electrical and piping details and connections.

207. Searchlight.

There will be installed on top of pilot house an electric searchlight on a high pedestal, as shown, of the Crouse Hinds Type SDX or equal type, of 10-inch aperture and fitted with a Mazda C lamp of 500 watts. This searchlight to be controlled by a handle arm conveniently located on pilot-house ceiling. A searchlight DP switch to be also placed for convenient access on ceiling.

208. Running Lights.

One set of oil-burning and electric approved galvanized-iron running lights, composed of two side lights, masthead light, stern light, and anchor light, all of size and approved pattern, fitted with Triplex lenses. Necessary fittings, side screens, masthead boxes, frames, etc., for hoisting and carrying same in proper positions. Water-tight electric connections. All lights supplied and located in accordance with United States Steamboat Inspection Service Rules and Regulations, as last amended.

209. Electrical Standards.

The electrical installations shall be made to conform to the standards and recommended practice of the American Institute of Electrical Engineers Marine Rules, the American Marine Standards Committee, and to meet all the requirements of the American Bureau of Shipping and the United States Steamboat Inspection Service Rules and Regulations, as last amended.

The plans and specifications for all proposed electrical equipment must be set forth in sufficient detail with views, data, and photographs such that a ready understanding of same may be had by the contracting officer, and same must be approved before orders for this equipment are proceeded with.

CHAPTER 5

GENERAL CONDITIONS APPLICABLE TO THE CONSTRUCTION OF THIS VESSEL

300. Piping.

All piping throughout the vessel to be arranged in approved manner, and all connections made as required. All exhaust and hot flanges to be made tight, with combined copper and asbestos gaskets, all water flanges with best rubber packing. In this Diesel-propelled vessel all main pipes to or from the sea, out-board suction of fire pump, and blow-offs to be of pure copper of thickness and with flanges in accordance with United States Navy standard. Piping and fittings for compressed air to pumps, steering gear, injectors, siphons, and whistle to be of brass. Such other piping of vessel, where specified, are to be of brass or copper, as directed. All bilge and tank suction to be provided with approved box strainers with bottoms and hinged tops. Fire-line pipes and fittings to be 1½-inch galvanized iron. All galvanized fittings to be malleable. All piping, etc., shall be efficiently drained and properly supported by hangers. Space each side of engine to be kept free of all piping that would interfere with clear passage.

Drain connections to be fitted for whistle and escape pipes. Any pipes passing through water-tight bulkheads must be properly flanged to same or fitted with stuffing boxes, as directed or approved. Sheet-metal protection for pipe covering in engine room where directed.

Air connection from auxiliary air pump to whistle tank to be made complete with galvanized pipe fittings and brass valves of best quality. See also item on whistle air tank. Piping for the main-engine air lines to be of the best high-pressure copper, or steel, as approved, capable of withstanding a pressure of 1,000 pounds per square inch and conforming in every respect with the best approved practice of the American Bureau and the United States Steamboat Inspection Service. All unions to be made air-tight to hold 1,000 pounds pressure per square inch.

Equalizing pipes of galvanized iron, 1½ inches in diameter, to be installed between the fuel-oil tanks in the tank hold space, there being an approved valve of very best type for the purpose installed at each tank for cutting off when desired.

Piping for oil service shall be full-weight galvanized iron, with composition pipes from service tanks to engines, all installed in a neat and workmanlike manner, and so arranged that there will be no traps nor gas pockets.

All lines smaller than 2 inches shall be made with ground-joint unions. Lines 2 inches and larger shall have flanged unions packed with Apex or equal approved oil-proof packing adapted to high-pressure work. All joints throughout to be made up with litharge and glycerine or other approved material.

All line fittings used in piping lines shall be **heavily beaded, malleable, and galvanized**. All piping, with its connections and leads, shall be efficiently drained and properly secured in place by hangers. Pipe coverings shall be installed on all heated lines as required, or as may be specifically specified.

All pressure piping to be given hydrostatic test in the presence of an inspector.

A carefully drawn and clear piping diagram shall be prepared especially for the ship engineer's use, and numerals and designations marked thereon shall correspond to the markings or labels actually placed on these pipes. This diagram—a print of black lines on a white background—shall be framed under glass in the engine room.

301. Valves.

Valves of approved size and pattern will be supplied wherever necessary to complete the various pipe systems as directed, whether specially mentioned or not.

Suction and discharge valves for circulating pumps, fire, and bilge pumps to be of cast composition of approved design. All sea valves will be bolted to cast-iron stools or flanges, and all stools for suction valves to have brass strainers flush with or rounded beyond lines of hull.

Necessary valves will be placed in the piping system between circulating pump and sea flanges. Outboard delivery valve for bilge pump discharge of the automatic check type. Relief valves at pumps as required. All necessary valves or manifolds of composition, double type, on all pump suction and discharges, each valve being plainly marked with brass name plate, secured to hand wheel. Discharge connections from manifolds to fore and aft compartments. Valves as required in fresh and salt water systems to control sections independently, also drain cocks and valves in pipes as directed. Special relief valves to be fitted to all pressure mains and air bottles to prevent excessive pressure. Every valve where directed shall be marked with a metal label plate with stamped letters showing to what connection it belongs and with arrow to indicate which way to turn the handwheel in order to open. All manifold and valve castings to be tested by hydrostatic pressure in presence of an inspector.

All valves will be extra heavy and of Crane, Lunkenheim, or other approved first-class make.

302. Final Trials.

The final trials for determination of the vessel's performance to ascertain its speed and the rate of revolutions for graduated mile runs will be essentially as set forth in the items devoted to this subject in the "General outline of specifications," paragraphs 4 and 6, all the conditions there shown being strictly complied with.

303. Final Documents.

Upon final delivery of this vessel to the representative of the War Department, it is required that all work of construction, fitting, and tuning up called for by these specifications must have been accomplished. All supplies and portable property must be on board, the vessel made completely ready for service in every respect, and the proper documents or certificates of completion must all be executed and delivered. These requirements are also as essentially set forth under the contract requirements specified in the "General outline of specifications," paragraphs 3, 4, and 5.

304. Docking and Delivery.

Just previous to the delivery of the vessel it must be dry-docked and have its bottom thoroughly cleaned and painted with same paints as heretofore specified, the bottom paint extending 6 inches above actual load water line with vessel ready for service. All paint work inside and outside throughout the

entire ship, as well as decks and varnished surfaces, shall be in a clean and satisfactory condition. All rooms, hold, bilges, and other spaces shall be thoroughly cleaned of all dirt and waste material; especial attention being given to the cleaning of the bilges in a thorough manner. The engine room shall be free from all contractor's tools, and the required spare parts and equipment furnished by the contractor shall be in proper shape and suitably stowed.

The contractor will be required to furnish sufficient oil fuel after all trials are completed for the vessel to make its trip to point of final delivery.

305. Preliminaries, Incident to Submission of a Bid.

As this is to be a Government vessel, appropriated for under an act of Congress, it is necessary that the intending bidders should inform themselves of the conditions which must be complied with in the submission of their bids, so that such tenders and bonds will be adequately formulated in order to receive proper recognition.

It is therefore very necessary that the intending bidders should thoroughly familiarize themselves with all the requirements of these specifications, drawings, and general conditions, as these requirements will be strictly adhered to, and any failure to comply with the conditions thus set forth may render a bid informal or liable to rejection.

Intending bidders, if they have not them already at hand, should request the following standard Government forms:

Standard Government form of invitation for bids. (Standard Form No. 20.) Construction contract.

Standard Government form of bid. (Standard Form No. 21.) Construction contract.

Standard Government instruction to bidders. (Standard Form No. 22.) Construction and supply contract.

Standard Government form of contract. (Standard Form No. 23.) Construction contract.

Standard Government form of bid bond. (Standard Form No. 24.) Construction on supply.

Standard Government form of performance bond. (Standard Form No. 25.) Construction or supply.

306. Delivery of a Complete Vessel is Required.

The intention is that bids be submitted for a complete vessel; that is, for the vessel with its power plant and all accessories and fittings as outlined in these specifications. Bidders may, if so desired, submit bids thus for complete vessel, but with alternative bids for vessel with power plant of different fabrication or name. But whatever the power plant estimated upon, tender or bid must provide for a complete vessel.

Bids on power plants independent of the hulls, and hence not a complete vessel, are not desired.

307. The Right to Reject Bids.

As required in article 16 of the sheet of "Instructions to Bidders," the Government reserves the right to reject any and all bids, or any part thereof, or to award to the lowest responsible bidder.

308. Definition of Contract Officials.

(a) The term "head of department" and the term "contracting officer," when used herein are as set forth in article 18 of the contract form issued to bidders.

(b) The term "the Quartermaster General," when used herein, shall mean the Quartermaster General or the Acting Quartermaster General of the Army as constituted at the particular time, or any person upon whom the duties of the Quartermaster General with respect to this contract may hereafter be conferred by statute or other competent authority.

(c) By "officer in charge" is meant the quartermaster of the corps area in which the contractor is located, or such aid or assistant as he may appoint to act in his place and stead.

(d) By "finance officer" is meant that officer of the Finance Corps of the Army who will make the payments as the work proceeds on the instructions of the Quartermaster General.

309. Time as an Element of the Contract.

As stated in the "Invitation to Bidders" the time required for the construction of this vessel will be an important factor governing the award of the contract. No credit will be given to a bidder who, with a view to drawing favorable attention to his bid, gives a time so short that it is not practicable for him to complete the work properly within its limits, and as a result requiring either an extension or completion of the work by the Government after the expiration of the time given in the contract. It is desirable that the work covered by the contract shall be completed ready for delivery as promptly as is possibly consistent with first-class work. See also article 17 of standard Government form of "Instructions to Bidders" on time of performance.

310. Limitation on Employment of Minors.

The contractor shall not employ in the performance of this contract any minor under the age of 14 years nor permit any minor between the ages of 14 and 16 years to work more than eight hours in any one day, more than six days in any one week, or before 6 a. m. or after 7 p. m.

311. Objectionable Employees.

The contractor will be required to discharge any employee who, in the opinion of the contracting officer, is objectionable or incompetent. This requirement shall not be made the basis of any claim for compensation or damages against the United States or any of its officers or agents.

312. Eight-Hour Law.

Attention is invited to the requirement of the standard Government form of contract, article 11 that compliance will be required with what is known as the eight-hour law.

313. Approval of "Sample" Articles.

The character of materials and workmanship entering into the construction of this vessel shall be in accord with the requirements expressed in the standard Government form of contract article 7. The contractor is cautioned against his proceeding on his own responsibility without proper authority in the purchase of materials. All orders for materials, if any be given, must be strictly filled as to sizes, quantities, etc., and deliveries in excess of the order are at the risk of the contractor, as will also be any substitution for any article ordered.

314. Character of Material.

All materials, fittings, etc., must be of the best for their respective purposes, and are to be furnished by the contractor, unless specified, and are to be of domestic production or manufacture, free from all defects.

315. Workmanship and Interpretation of Specifications.

The entire work must be done in the best, most substantial, and thoroughly workmanlike manner, according to the true intent and meaning of the specifications; and if in any respect the specifications are not understood or they shall appear to be ambiguous or in conflict, then the true intent and meaning thereof shall be left to the decision of the officer in charge, whose decision shall be final.

316. Immaterial Omissions in Specifications.

The omission or addition of a letter, word, punctuation mark, signs indicating inches as ("), feet ('), and degrees (°), will in no way change the true intent, spirit, and meaning of the specifications.

317. Inspection for Defective Workmanship or Material.

Attention is directed to the requirements set forth in the standard Government form of contract, article 6, "Inspections," in order that the contractor may comply with these conditions thus set forth. Further, it is required that the contractor shall give his personal superintendence or have some competent person to superintend the work at all times during working hours and to receive instructions. No material furnished or work done which may be defective or deficient in any of the requirements of these specifications is to be considered as accepted in consequence of any negligence of any inspector or other authorized person to point out such defects or deficiency during the execution of this contract, and the contractor will be required to replace any inferior material or correct any imperfect work whenever discovered. If any of the materials proposed to be used in the work shall be condemned by the officer in charge or his representative as unsuitable, it shall, on written notice of such condemnation from the officer in charge, or his representative, be forthwith removed and material which does so conform shall be furnished and delivered instead thereof. In case of refusal to or undue delay in complying with such direction, the contractor shall be liable for any loss or damage that may ensue, and in such case the officer in charge may cause the contractor to assume all costs incurred thereby. The contractor shall furnish all transportation, skilled and unskilled labor, materials, tools, apparatus, scaffolding, and utensils necessary for performing the work in the best manner according to the specifications. The articles or work are subject to observation, inspection, and tests by the United States at any and all times during manufacture or performance, in order to determine their compliance with the requirements of this contract, and are subject to acceptance or rejection by the United States. For these purposes the United States will maintain an inspector or inspectors at the plants or places where and during the time this contract is being performed. Such inspectors may reject any and all articles or work, or components thereof, and materials found not to be in compliance with the requirements of this contract. No preliminary test or acceptance shall preclude the United States from rejecting any articles or work upon final inspection or test at completion. The contractor shall furnish all reasonable facilities and assistance requested by such inspectors for the performance of their duties. Inspections and tests by the United States shall be carried out in such a manner as not unduly to delay the performance of this contract by the contractor. Nothing contained in this article shall limit or annul any inspection or test which may be called for by the drawings and specifications forming a part of this contract. No inspection, acceptance, or payment under this contract shall deprive the United States of any claim against the contractor hereunder by

reason of fraud or deception or by reason of latently defective articles, materials, or workmanship.

318. Patent Rights.

The use of patented articles shall follow the conditions outlined in the standard Government form "Instructions to Bidders," article 25.

319. Adjustment of Disputes.

Shall be provided for as set forth in article 15 of the standard Government form of contract, and it is further specially to be noted that work should be diligently proceeded with in the meantime.

320. The Contract to Definitely List Items for Proposed Accomplishment.

In order that there may be no occasion for disputes between the hull contractor and engine subcontractor, in case a separate subcontract is entered into for the engine plant, each of said contractors shall definitely list in his tender such parts of the work as he proposes to accomplish, either by specifically mentioning the items embraced or by reference to the numerals of paragraphs of these specifications which cover the same by description. Should situations arise when the terms or the rights of the parties can not be determined by usual course of correspondence, then the Quartermaster General can call for the meeting of a board to consist of a representative of each of the contracting parties, together with the representative of the contracting officer; the three of whom to meet at a designated place to examine the conditions or the records, and then to submit a combined report to the Quartermaster General. After a review of the papers in the case, his decision shall thereupon be deemed as final.

321. Damages, General, to Vessel.

The contractor will be held responsible for all damages to the vessel from fire, frost, or other causes during its construction, and until it is accepted. (See also par. 328, "Insurance.")

322. Damages to Personnel, Property, etc.

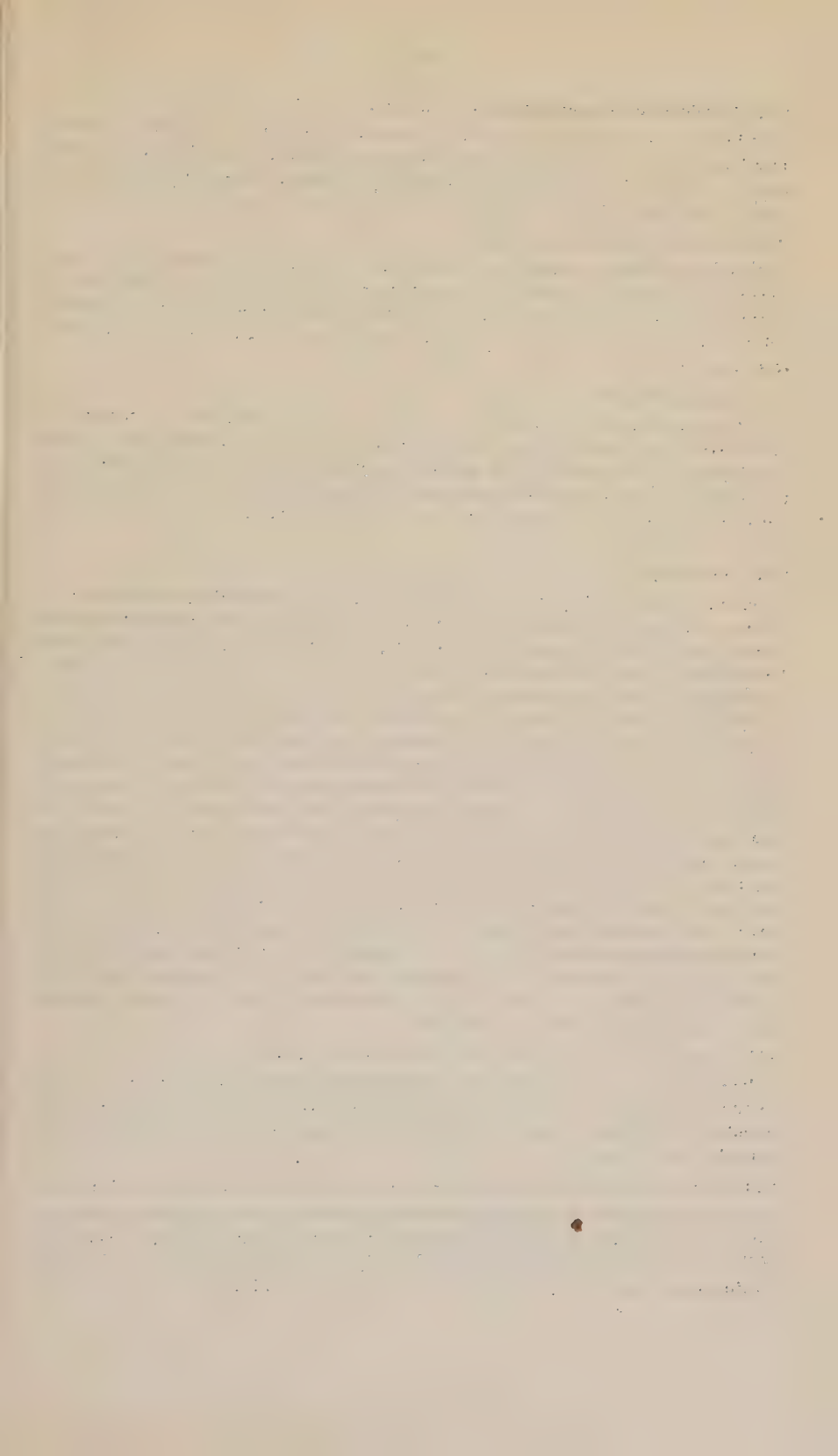
The contractor shall be liable for all damages to persons, or property, animals, vehicles, etc., due to negligence of himself, his agents, or employees during the prosecution of the work, and for all damages due to defective scaffolding arising from any negligence whatsoever on the part of himself, his agents, or employees. Any charges due for premiums for workmen's indemnity or compensation acts, whether levied by Federal, State, or municipal legislation, shall be paid for and borne by the contractor. All local workmen's indemnity laws must be complied with, as no workmen employed in the construction of this vessel are Federal employees. All work required in carrying out this contract shall be performed in full compliance with the laws of the State, Territory, or District of Columbia where such labor is performed.

323. Drawings as a Guide to Contractors.

Such drawings as are furnished are intended to cooperate with and to form a part of these specifications and the accompanying contract; and shall be used and referred to in the standard Government form of contract, article 2.

324. Changes of Drawings and Specifications May Be Made by the Government with Adequate Compensation.

The United States may, by a written order to the contractor at any time, and without notice to the sureties, make reasonable changes in the drawings, specifications, conditions of delivery, or other provisions in this contract, all to be in accordance with the standard Government form of contract, article 3.



325. Certificate of Inauguration of Contract.

Following the award of contract, or as soon as actual preparation of plans may have begun, the contractor shall execute a certificate that he has actually begun the work of constructing this vessel and forward same to the contracting officer. This date to be of record as of any time before June 30, 1928.

326. Sundays, Holidays, and Nights.

Under contracts for service, no work shall be done on Sundays or on days declared by Congress as holidays for per diem employees of the United States except in cases of emergency, and then only with the consent of the contracting officer; nor shall any work be done at night unless authorized by the contracting officer.

327. Customs Duties.

Unless specifically authorized by law, the contractor will not be entitled to free entry or remission of any customs duties on imported articles used in the fulfillment of this contract. All material, equipment, and supplies worked into this vessel must be of domestic manufacture or production unless it can be conclusively shown that no such American articles or materials are obtainable. (See also par. 314.)

328. Insurance.

Insurance against fire, frost, storms, and other damage will be required to be taken out by the contractor to the full value of the work as completed on the vessel; and should damage arise due to fire or other cause, said damage shall be repaired by the contractor, who shall deliver the boat complete to the War Department satisfactory in every respect.

Before demanding payment of the several installments as they become due (with the exception of the final payment), the contractor shall adequately insure the work against damage by fire or other causes in a responsible domestic insurance company approved by the Government, the insurance being sufficient to cover the amount of such installment. He shall make the policy of insurance payable in case of loss to the United States and deliver same to the finance officer of the designated corps area, United States Army, as security for the performance by him of this agreement to repair above-mentioned damages. Such policy shall be kept in full force until the entire work on the vessel shall have been completed and document of acceptance signed and receipted for by the authorized representative of the Government. The purchase and delivery of said policy of insurance to the representative of the Government shall be a condition precedent to the right of the contractor to demand or receive payment of such installments under the contract.

329. Penalty for Delay in Delivery, Liquidated Damages.

The formal contract for the construction of this vessel will contain a proviso to the effect that the liquidated damages, as provided for in article 9 of the standard Government form of contract, will be on the basis of \$50.00 for each calendar day's delay.

330. This Contract Must Have Preference if United States Is Engaged in War.

If the United States is engaged in war, the contractor will be required to give the performance of this contract precedence over all other contracts, except prior contracts involving the preparation of war material for the United States unless specifically superseded by a priority certificate.

331. Congressional Appropriation and Procurement Authority, as Stated in the Standard Government Form of Contract, middle of page 7.

The vessel proposed to be obtained by this contract was duly authorized by Congress under act approved February 23, 1927, Public Document No. 630, Sixty-ninth Congress, known as "An act making appropriations for the military and nonmilitary activities of the War Department" for the fiscal year ending June 30, 1928, under the article "Army transportation," with the amount of \$30,000 being apportioned for this purpose, and provision made for the construction of this vessel for the purpose set forth therein. The costs of construction will be chargeable to procurement authority No. QM-1341-P-1227-A-19-8, dated March 10, 1927, appropriation A-T-1928-B (E), the available balance of which is sufficient to cover cost of the same.

332. Progress and Percentage Reports.

The contractor shall from time to time, and whenever so requested, furnish to the Quartermaster General, or to such person as the Quartermaster General may designate, statements and reports on the progress of the performance of this contract and full information on all factors relating to deliveries or performance hereunder. These reports to be submitted monthly and at such other times as requested, and shall show the progress toward completion of the whole vessel, and shall be arranged as a percentage of whole to complete.

333. Railroad Rates, Increase or Decrease.

It is distinctly understood that the prices of articles covered by this contract, where delivery at a contractor's yard is provided for, is based upon the present freight rates as established by railroad tariffs, and should, during the life of this contract, such railroad rates be increased or decreased, then the price at which the article sold for delivery at contractor's yard under this contract is fixed shall not be accordingly increased or decreased corresponding therewith. In short, the vessel contracted for must be delivered at the contract price irrespective of any variation of freight rates.

334. Increase or Decrease, Changes, or Extras.

Shall be as set forth in the conditions outlined in the standard Government form of contract, articles 3, 4, and 5, entitled "Changes, changed conditions, and extras."

335. Termination of Contract Due to Delays.

Shall be as provided for in the standard Government form of contract, article 9, in which are set forth the conditions which will hold in case the contract is unduly or improperly delayed.

336. List of Documents, etc., Constituting a Proper Bid.

The contractor's proposal sheet or sheets, these specifications, and any drawings which the contractor may submit, and the *certificates of the contractor's corporation* that a certain official or officials are authorized to sign for the corporation will constitute part and parcel of the bid to be submitted by a bidder for this vessel.

337. Payments.

The executed contract shall provide for payment as follows:

"For and in consideration of the faithful performance of the stipulations of this contract the contractor shall be paid by a disbursing officer, otherwise termed the 'finance officer,' designated to make the payments, the prices stipulated in this contract for the vessel, supplies, or materials furnished and serv-

ices performed; the total amount set forth in the contract to be subject, however, to such increases or decreases as are authorized herein or as may be found necessary by the omission or addition of work at unit prices, and less the amount of damages or other proper charges, if any, herein provided for. Payment will be made at such times and in such amount as the contracting officer may elect, based upon estimates to be made by him of percentages of completed work or deliveries and in such proportions as shown in detail in the following paragraph."

338. Order in Which Payments Are Made.

Payments will be made in five equal payments of 20 per cent of contract price as the work progresses on this vessel, based on the estimates of the officer in charge, provided that in his opinion the work is progressing satisfactorily, in the following manner:

1. Twenty per cent when keel is laid and when transverse frames have been erected, including main-deck beams, upper-deck beams, and bulkheads.
2. Twenty per cent when hull and decking have been completed and there has arrived in good condition the propelling machinery, viz, main engine, Diesel, and its equipment, but not including auxiliaries.
3. Twenty per cent upon the complete installation of propelling machinery, viz, engine, its auxiliaries, piping, and shafting, together with the completion of the upper and lower deck erections sheathed, and with doors, skylights, windows, and divisional bulkheads in place and all joiner work is complete.
4. Twenty per cent when vessel has been launched and vessel has passed with satisfactory completion of official trials.
5. Of the 20 per cent payable as the last proportion 10 per cent will be payable upon the delivery of the completed vessel at either the Brooklyn N. Y., Army Base, or San Francisco Calif., Army Base, by the contractor and acceptance of same by the War Department, while 10 per cent will be reserved and paid 60 days after delivery and acceptance by the Government, providing no defects have arisen.

The last payment of 10 per cent of the contract price will be reserved for a period of 60 days after the delivery and acceptance of the vessel, and will be paid at the expiration of this period, provided no defects due to inferior material or bad workmanship have been detected. Should any defects be discovered, the contractor will make such defects good at his own expense immediately after the vessel has been placed at his disposal, and the reserved tenth payment of 10 per cent will be withheld until this is done. Should the contractor fail to make the necessary repair or to remedy the defects at his own expense as above stated, the same will be made by the United States and the cost thereof shall be defrayed from the retained 10 per cent, and the balance remaining, if any, will then be paid to the contractor.

339. Title Progressive as Work Proceeds.

Attention is called to the conditions as shown in the standard Government form of contract, article 16, paragraph (c) and (d):

As each of the payments above stipulated is made, possession of the material and labor which are paid for by these payments shall pass to and the title thereof shall be vested in the United States; but this provision shall not be construed as relieving the contractor from the sole responsibility for the care and protection of materials, work, and vessel, upon which payments have been made, or the restoration of any damaged work, or as a waiver of the right of the Government to require fulfillment of the terms of the contract.

340. Responsibility for Supplies Tendered.

If the contractor delivers material in compliance with all conditions of this agreement to the designated point, and the goods are stored in the Government warehouses pending final inspection and acceptance or rejection, the Government shall assume responsibility for the material, but the contractor shall bear all risk on material rejected, after the notice of rejection.

341. Types of Power Plant Optional.

It is desired that contractors should submit bids with the propelling power plant, selected from American-built Diesel engines. One or more types of such engines to be figured upon if desired by any contractor. Contractors for vessels to tender for complete vessels.

The types of equipment and auxiliaries proposed to be used with each type of motive power shall be as in general indicated in these specifications or as may be necessary as a proper adjunct to the power plant adopted even though not specifically mentioned herein.

The bidder shall indicate by diagram, by builder's drawings, and photographs just what type of power plant he intends to furnish. Its speed, horsepower, weight, and space must also be clearly indicated.

The final adoption of the type of power plant to be used will be referred for the decision of the Quartermaster General.

342. Forwarding the Bids.

In forwarding the bids to the Quartermaster General, War Department, it is very desirable that the standard Government form of bid known as No. 21 should be duly made out and forwarded in the manner there suggested; these being marked:

"Proposals for construction of wooden distribution box vessel 'L 63' or class to be opened at office of the Quartermaster General, War Department, Chief of Transportation, Room No. 2014 Munitions Building, War Department, on June 8, 1928."

B. F. CHEATHAM,
Major General, United States Army,
The Quartermaster General.

WAR DEPARTMENT,
Washington, D. C., May 3, 1928.

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